Service Manual

ViewSonic GS790

Model No. VCDTS21528-1

19" Digital Controlled Color Monitor
(18" viewable) Graphics Series



(Rev. 2 – January 2000)

ViewSonic® 381 Brea Canyon Road, Walnut, California 91789 USA - (800) 888-8583

Revision History

Revision	Date	Description Of Changes	Approval
1.0	10/22/99	Initial Issue	T. Sears
2.0	1/24/00	Added Exploded Parts List (pg. 65a)	T. Sears

TABLE OF CONTENTS

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians.
Any attempt to service or repair the product or products dealt within this service information by anyone else could result in serious injury or death.

SAFETY PRECAUTIONS

1 CAUTION

No modification of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety checks and servicing guide lines.

2 SAFETY CHECK

Care should be taken while servicing this CRT display because of the high voltage used in the deflection circuits. These voltages are exposed in such areas as the associated flyback and yoke circuits.

3 FIRE & SHOCK HAZARD

3-1 Insert an isolation transformer between the CRT display and AC power line before servicing the chassis.

3-2 In servicing pay attention to original lead dress especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.

3-3 All the protective devices munt be reinstalled per original design.

3-4 Soldering must be inspected for possible cold solder joints, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign material.

4 LEAKAGE CURRENT COLD CHECK

4-1 Unplug the AC cord and connect a jumper between the two prongs on the plug.

4-2 Turn the CRT display power switch "on".

4-3 Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metallic part on the CRT display such as the metal frame, screwheads, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be 1.8 megohm minimum.

5 LEAKAGE CURRENT HOT CHECK

5-1 Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during this check.

5-2 Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15uF capacitor between each exposed metallic part and a good earth ground(as shown in Fig.1).

5-3 Use an AC voltmeter with 1000 ohm/volt or more sensitivity and measure the AC voltage across the combination 1500 ohm resistor and 0.15uF capacitor.

5-4 Move the resistor connection to each exposed metallic part and measure the voltage.

5-5 Reverse the polarity of the AC plug in the AC outlet and repeat the above measurement.

5-6 Voltage measured must not exceed 7.5 volt RMS, from any exposed metallic part to ground A leakage current tester may be used in the above hot check, in which case any current measured must not exceed 5.0 milliamp. In the case of a measurement exceeding the 5.0 milliamp value, a rework is required to eliminate the chance of shock hazard.

Note: High voltage is present when this CRT display is operating. Always discharge the anode of the picture tube to the display chassis to prevent shock hazard.

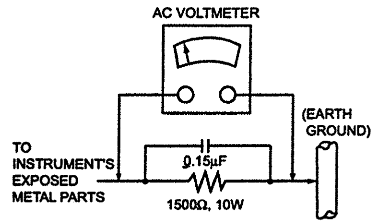


Fig. 1

6 IMPLOSION PROTECTION

Picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage and scratching during installation.

7 X-RADIATION

WARNING : The only potential source of X-Radiation is the picture tube. However when the high voltage circuit is operating properly there is no possibility of X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory- recommended level.

Note: It is important to use an accurate periodically calibrated high voltage meter.

7-1 The procedure for adjusting high voltage is shown on page 19.

7-2 If high voltage cannot be set to 24kV, immediate service is required to prevent the possibility of premature component failure.

7-3 To prevent X-Radiation possibility it is essential to use the specified picture tube.

IMPORTANT SAFETY NOTICE

There are special components used in this CRT displays which are important for safety. These parts are identified by the international symbol ⚠ on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-RADIATION, shock, fire, or other hazards. Do not modify the original design or this will void the original parts and labor guarantee.

1. Engineering Specification

1. Scope.

1.1 This specification defines the configuration and performance requirements for the ViewSonic corporation GS790 computer monitor.

1.2 Product configuration/Magnetic requirements

GS790

Model number	Location	Magnetic requirement
VCDTS21528-1M	North America	Bh=250mG±10mG,Bv=490mG±10mG
VCDTS21528-1E	Europe	Bh=+/-250mG±10mG,Bv=490mG±10mG
VCDTS21528-1A	Australia	Bh=+/-270mG±10mG,Bv=-570mG±10mG
VCDTS21528-1P	Pacific	Bh=+/-250mG±10mG,Bv=490mG±10mG

2. Input requirements.

2.1 AC power supply.

2.1.1 Power source	: 90~264VAC, 50/60Hz.
2.1.2 Power consumption	: Less than 130W(GS790).;110W(E90/Q95).
2.1.3 Inrush current	: Less than 40Ao-p for 1/2 cycle on cold starting.
2.1.4 Input current	: 3A max.
2.1.5 Leakage current	: 0.75mA at AC 100V/240V.
2.1.6 Ripple / noise	: Should not cause any visible interference.
2.1.7 Power cable / color	: 1.83 meter / match with cabinet.

M model : 3-prong NEMA 5-1 5P type plug
E model : Shuko CEE7-7
P model : PC type and US Wall
A model : ASA
G model : Great Wall type

2.2 Video interface.

2.2.1 RGB video	: Analog, 0.7Vp-p, positive, input impedance 75ohm.
2.2.2 Max PC video signal	: 950mV with no damage to monitor.
2.2.3 Max MAC video signal	: 1250mV with no damage to monitor.
2.2.4 Sync signal	: Separate or composite horizontal and vertical sync (TTL level).
2.2.5 Signal cable / color	:1.83 meter ivory PC99 / match with cabinet.

2.2.5 Input connector :

15 pin mini "D" sub :

Pin No.	Signal	Pin No.	Signal
1	Red	9	NC
2	Green	10	Ground
3	Blue	11	Ground
4	Ground	12	SDA
5	Ground	13	H. Sync
6	R Return	14	V. Sync
7	G Return	15	SCL
8	B Return		

2.2.6 Signal memory modes : 13 preset modes(GS790)
18 user modes, see **Appendix A.**

2.2.7 Plug & play : VESA DDC1 / 2B, DDC data **Appendix B.**

2.2.8 Input signal timing compatibility : VESA GTF

2.3 Scanning frequency.

2.3.1 Horizontal : 30KHz to 95KHz -> GS790

2.3.2 Vertical : 50Hz to 180Hz -> GS790

3. Adjustment control.

3.1 User control.

3.1.1 Power switch.

3.1.2 OSD key.

[1]	: Function select button.
▽	: Adjustment button.
△	: Adjustment button.
[2]	: Function select button.

3.2 OSD adjustment function.

a. Contrast / Brightness.
b. H. size / Position.
c. V. Size / Position.
d. Pincushion / Balance.
e. Trapezoid / Parallel.
f. Top / Bottom Hook
g. Tilt.
h. H / V Moire
i. H / V Focus
j. Input level
h. Degauss.
i. Viewmeter.
j. Viewmatch color : 9300°K / 6500°K / 5000 °K User (R, G, B).
k. Language.
l. Memory recall.

3.3 LED indication.

Status			LED
Power on	Normal		Green
	Power saving	Stand-by Suspend Off mode	Orange
	Over range frequency		Orange
Power off			Off

4. Electrical specification.

A. Electrical specification.

4.1 Standard condition of measurement.

4.1.1 Brightness – 50% factory shipment condition.

4.1.2 Contrast – 100% factory shipment condition (MAX).

4.1.3 Preset color – 9300°K.

4.1.4 Brightness 30FL (Full white).

4.1.5 Warm up time – Start testing 30 minutes or more after power on.

4.1.6 Timing chart – Refer to **Appendix A.**

4.2 CRT specification.

Item	Spec
CRT	HITACHI:M46LQW180X02(GS790)
Size	19 inch
Diagonal(Viewable area)	18 inch
Mask type	Shadow Mask
Pitch	0.26mm(GS790)
Faceplate treatment	AGAS
Transmission percentage	44%(GS790)

4.3 Power saving.

4.3.1 Power saving.

Status	Horizontal Sync.	Vertical Sync.	Power consumption	Power LED	Recovery time
Normal	Yes	Yes	< 130W(GS790) < 110W(E90/Q95)	Green	N/A
Stand-by	No	Yes	< 15W	Orange	< 3 sec
Suspend	Yes	No	< 15W	Orange	< 3 sec
Off	No	No	< 3W	Orange	< 10 sec

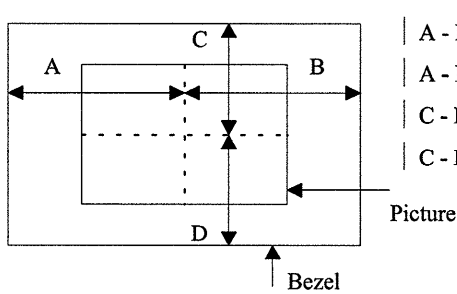
B. Screen characteristics.

4.4 Picture display size.

Horizontal size : 357± 4mm (primary mode) / 357± 5mm (other mode).

Vertical size : 268± 4mm (primary mode) / 268± 5mm (other mode).

4.5 Picture center.(Correctable to zero)



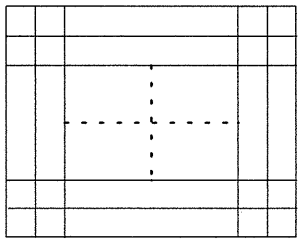
| A - B | ≤ 4mm for primary preset

| A - B | ≤ 5mm for other preset

| C - D | ≤ 4mm for primary preset

| C - D | ≤ 5mm for other preset

4.6 Linearity.



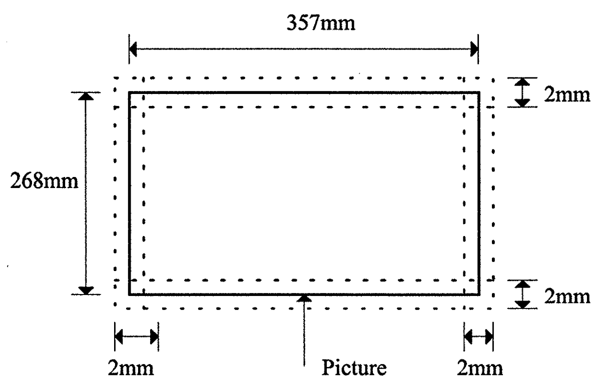
H-Linearity : $\frac{Xmax - Xmin}{Xmax + Xmin}$ X 100% $\leq$ 4% for adjacent
$\leq$ 5% for worst case

V-Linearity : $\frac{Ymax - Ymin}{Ymax + Ymin}$ X 100% $\leq$ 4% for adjacent
$\leq$ 5% for worst case

Input singal : Cross-hatch pattern
16x12

4.7 Picture distortion.

4.7.1 Trapezoid / Parallelogram / Orthogonality / 2mm Box.

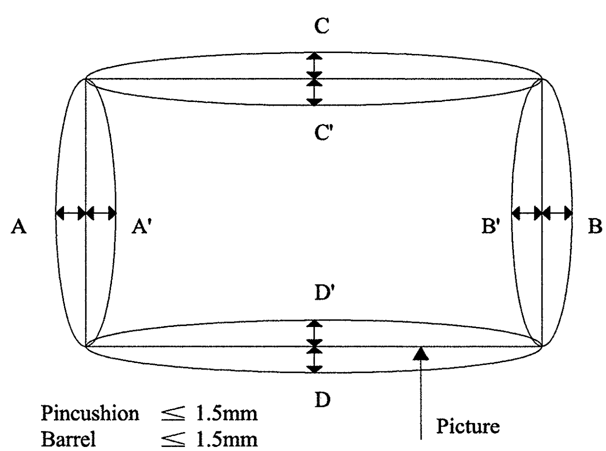


Trapezoid:
Horizontal $\leq$ 2mm
Vertical $\leq$ 1.5mm

Parallelogrm $\leq$ 2mm

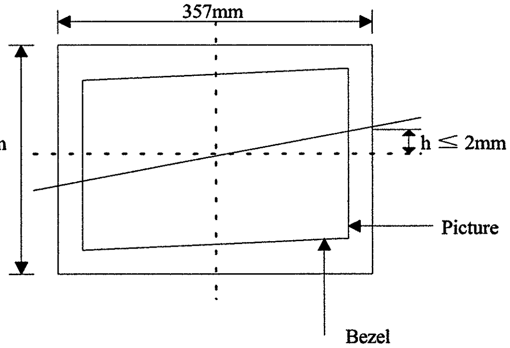
Orthogonality $\leq$ 1.0degrees

4.7.2 Pincushion / Barrel / Pin-balance.

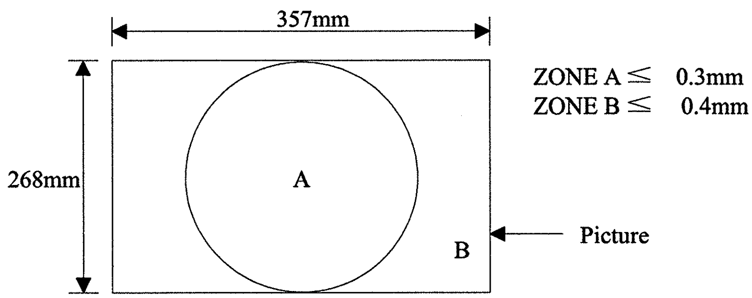


Pincushion $\leq$ 1.5mm
Barrel $\leq$ 1.5mm

4.7.3 Tilt.(adjustable to zero)



4.8 Misconvergence.



4.9 Focus.

4.9.1 Under the condition of brightness center and contrast maximum "mE", pattern can be seen clearly by using the 1024x768 60K/75Hz. If necessary, limit sample agreed by both parties will be made for final focus judgement.

4.10 Jitters : Less than 0.1mm.

4.11 White balance.

4.11.1 Color temperature : Using the CIE color temperature coordinate system.

Color 9300°K : x = 0.283± 0.02.
y = 0.297± 0.02.

Color 6500°K : x = 0.313± 0.02.
y = 0.329± 0.02.

Color 5000°K : x = 0.346± 0.02.
y = 0.359± 0.02.

4.11.2 Color tracking : When the full white pattern display at preset condition. (only for 9300°K)

$|x_{25.75FL} - x_{10FL}| \leq 0.007.$

$|x_{25.75FL} - x_{30FL}| \leq 0.003.$

$|y_{25.75FL} - y_{10FL}| \leq 0.010$

$|y_{25.75FL} - y_{30FL}| \leq 0.003.$

4.11.3 Video amplifier linearity, input step :

$|x_{600mV} - x_{700mV}| \leq 0.007.$

$|y_{600mV} - y_{700mV}| \leq 0.003.$

4.11.4 Color purity : Impurity should not appear in the pattern of all green, all red, or all white.

4.12 Light output.

4.12.1 At 70mm x 70mm white block pattern : 40± 4FL.

4.12.2 At full-white pattern : 30± 2FL.

4.13 Brightness uniformity.

4.13.1 25% deviation maximum between center any eight points within the display picture.

A	B	C
D	Center	E
F	G	H

4.14 Image regulation.

4.14.1 Static regulation ≤ 1mm.

4.14.2 Dynamic regulation ≤ 1mm.

4.14.3 Temperature and line voltage ≤ 0.5% of line length.

5. Environmental conditions.

5.1 Temperature and humidity at operation : 0°C ~40°C.
5% ~ 95% RH (Non condensing).

5.2 Temperature and humidity at storage : -40°C ~ 60°C.
5 ~ 95% RH (Non condensing).

5.3 Vibration test (packaged) :
Vibration Frequency : 5 ~ 250Hz.
Acceleration : 1G.
Sweep time : 1 oct. / min.
Test time : 60 min per axis.

5.4 Drop test (packaged) : 70cm height.
1 corner, 3 edges, 6 faces.

5.5 Altitude :

Operating	: 0 ~ 3000 feet.
Non-operating	: 0 ~ 12000 feet.

6. Physical specification.

6.1

Dimension.	GS790
Height	412mm.
Width	448mm.
Depth	412mm.
Footprint width	275mm.
Footprint depth	310mm.
Monitor weight	20Kg.

6.2 Mechanical adjustment.

Tilt	- 5 / + 15 degrees.
Swivel	± 90 degrees.

6.3 Packaging.

6.3.1 Carton dimension.

	GS790
Height	506mm.
Width	556mm.
Depth	578mm.

6.3.2 Shipping weight : 22.5Kg.

6.3.3 Container loading ; 352 units.

7. Manuals and documentation

7.1 Inserted materials：
Production sample of the User's Guide ,Rear Label and all other Inserted Materials will be provided to ViewSonic for approval before mass production.

8. Regulatory and Safety

8.1 North America
Model name : GS790
UL1950；DHHS Part 21, Subpart J；FCC part 15, Subpart J, Subpart B ,CSA 22.2 NO.950-MI989；DOC, ICES-003, CLASS B；NOM (to be applied by ViewSonic).

8.2 International
Model name : GS790
EN60950 and TUV/GS MARK ; TCO 92 for M/P/A models ;TCO99 for E model ; PTB X-RAY；NEMKO, DEMKO, SEMKO, FEMKO；CE；CB REPORT；CB CERTIFICATE；BCIQ；VCCI；C-TICK ; EPA ; S. Africa ; CCIB ; S-Mark ;   PCT, SASO, B-MARK and Argentina

8.3 TCO99/ISO14001(GS790 only)

8.4 Power Management：ENERGY 2000, < 3W off state.
Amendment to EnergyStar Version 2 MOU,dated.

9. Video communications

9.1 EDID Standard and Structure
VESA's EDID Standard Version #3, Revision #0, EDID Structure Version #1.2, Revision #1.

9.2 EDID Vendor Name
VSC: Byte 8 – 5Ah, Byte 9 – 63h.(GS790   )

9.3 EDID Product ID
The shall be encoded as an ASCII representation of the first two digits of the North American serial number.
Byte 10 = 4Dh, Byte 11 = 4Fh (GS790)

9.4 EDID Established Timing

Shall match with the factory timing settings specified by ViewSonic above in section 6.0.

9.5 Approvals

File contents shall be approved by ViewSonic prior to Mass Production Release.

9.6 USB(Optional)

A High Speed Active (one upstream port and four downstream ports) Hub shall be quoted as an option. The USB cable supplied with the unit shall be two meters long. A Host on Screen Display, based on ViewSonic Screens, compatible with Microsoft Windows 95 "4.00.950 B" and Windows 98, shall be supplied.

10 Coding assignment

10.1 Product Name and Model Number.

Product Name：View Sonic GS790

North America	Model Number VCDTS21528-1M
Europe	Model Number VCDTS21528-1E
Asia	Model Number VCDTS21528-1P
Australia	Model Number VCDTS21528-1A

10.2 Serial Number Format

PPYWWnnnnn where
PP = Regional Product ID Code
Y = Last digit of manufacturing year
WW = Manufacturing week
Nnnnn = Production sequence number
(Assigned by factory)

10.3 Regional Product ID code

Model name : GS790

North America	ID Code: MO
Europe	ID Code: NO
Asia	ID Code: MP
Australia	ID Code: PO

10.4 UPC coding

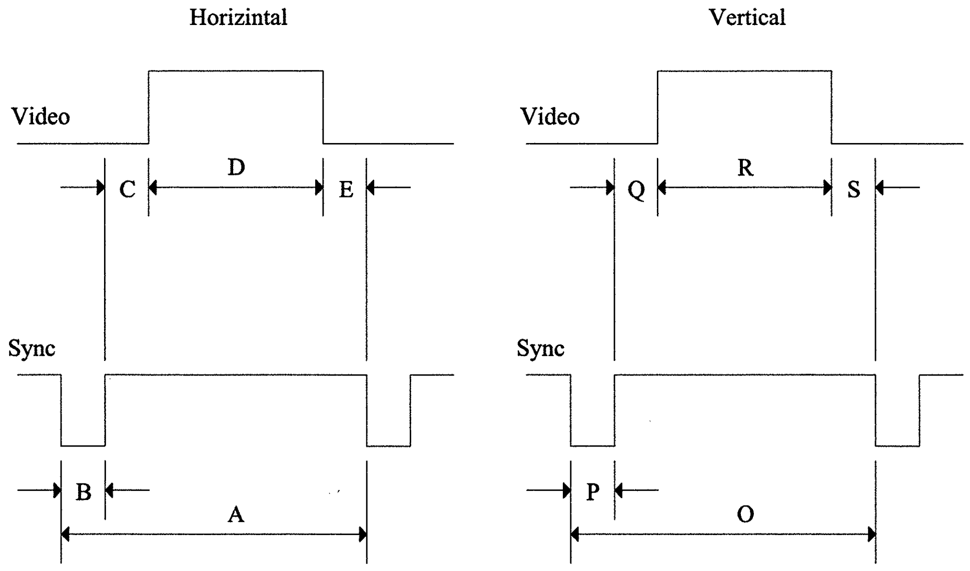
Model name : GS790

North America	UPC Code: 7 66907 13241 0
Europe	UPC Code: 7 66907 14241 9
Asia	UPC Code: 7 66907 13251 9
Australia	UPC Code: 7 66907 15241 8

10.5 FCC ID code

Self-Declared

Appendix A : Factory preset timings.



Sync Polarity : Positive / Necgative

Timing chart : GS790

Mode No.	1	2	3	4	5	6	7	8	9	10
Mode Name	VGA 640 x 400	VGA 640 x 480	VGA 640 x 480	VESA 800 x 600	VESA 800 x 600	VESA 1024 x 768	VESA 1024 x 768	VESA 1280 x 1024	VESA 1280x 1024	VESA 1280x 1024
Horizontal Freq. (KHz)	31.469		37.500	46.875	53.674	60.023	68.677	63.981	79.976	91.146
Sync. Polarity	–	–	–	+	+	+	+	+	+	+
A H. total(us)	31.778		26.666	21.333	18.631	16.660	14.561	15.63	12.504	10.971
(Dots)	(800)		(840)	(1056)	(1048)	(1312)	(1312)	(1688)	(1688)	(1728)
B H. sync(us)	3.813		2.032	1.616	1.138	1.219	1.016	1.037	1.067	1.061
(Dots)	(96)		(64)	(80)	(64)	(96)	(96)	(112)	(144)	(160)
C H. back porch(us)	1.907		3.809	3.232	2.702	2.235	2.201	2.296	1.837	1.422
(Dots)	(48)		(120)	(160)	(152)	(176)	(208)	(248)	(248)	(224)
D H. active(us)	25.422		20.317	16.162	14.222	13.003	10.836	11.852	9.481	8.127
(Dots)	(640)		(640)	(800)	(800)	(1024)	(1024)	(1280)	(1280)	(1280)
E H. front porch(us)	0.636		0.508	0.323	0.569	0.203	0.508	0.444	0.119	0.406
(Dots)	(16)		(16)	(16)	(32)	(16)	(48)	(48)	(16)	(64)
Vertical Freq. (Hz)	70.089	59.940	75.000	75.000	85.000	75	85.000	60.200	75.025	85.024
Sync. Polarity	+	–	–	+	+	+	+	+	+	+
O V. total(ms)	14.268	16.684	13.333	13.333	11.756	13.853	11.765	16.661	13.329	11.761
(Lines)	(449)	(525)	(500)	(625)	(631)	(666)	(808)	(1066)	(1066)	(1072)
P V. sync(ms)	0.064	0.064	0.080	0.064	0.056	0.125	0.044	0.047	0.038	0.033
(Lines)	(2)	(2)	(3)	(3)	(3)	(6)	(3)	(3)	(3)	(3)
Q V. back porch(ms)	1.112	1.048	0.426	0.448	0.503	0.478	0.524	0.594	0.475	0.483
(Lines)	(35)	(33)	(16)	(21)	(27)	(23)	(36)	(38)	(38)	(44)
R V. active(ms)	12.711	15.254	12.800	12.800	11.179	12.480	11.183	16.005	12.804	11.235
(Lines)	(400)	(480)	(480)	(600)	(600)	(600)	(768)	(1024)	(1024)	(1024)
S V. front porch(ms)	0.381	0.381	0.027	0.021	0.019	0.770	0.015	0.016	0.013	0.011
(Lines)	(12)	(10)	(1)	(1)	(1)	(37)	(1)	(1)	(1)	(1)
Video clock Freq. (MHz)	25.175		31.501	49.500	56.250	56.250	94.500	108.00	135	157.5
(ns)	(39.72)		(31.7)	(20.2)	(17.78)	(17.78)	(10.58)	(9.26)	(7.4)	(6.3)

Timing chart : GS790

Mode No.	11	12	13	
Mode Name	VESA 1600x 1200	MAC 832 x 624	MAC 1152X 870	
Horizontal Freq. (KHz)	93.75	49.717	68.681	
Sync. Polarity	+	–	-	
A H. total(us) (Dots)	10.667 (2160)	20.115 (1152)	14.56 (1456)	
B H. sync(us) (Dots)	0.948 (192)	1.118 (64)	1.280 (128)	
C H. back porch(us) (Dots)	1.501 (304)	3.911 (224)	1.44 (144)	
D H. active(us) (Dots)	7.901 (1600)	14.528 (832)	11.52 (1152)	
E H. front porch(us) (Dots)	0.316 (64)	0.558 (32)	0.32 (32)	
Vertical Freq. (Hz)	75	74.530	75	
Sync. Polarity	+	–	–	
O V. total(ms) (Lines)	13.333 (1250)	13.417 (667)	13.322 (915)	
P V. sync(ms) (Lines)	0.032 (3)	0.060 (3)	0.044 (3)	
Q V. back porch(ms) (Lines)	0.491 (46)	0.784 (39)	0.568 (39)	
R V. active(ms) (Lines)	12.8 (1200)	12.552 (624)	12.667 (870)	
S V. front porch(ms) (Lines)	0.011 (1)	0.021 (1)	0.044 (3)	
Video clock Freq. (MHz) (ns)	202.5 (4.9)	57.270 (17.5)	100 (10)	

Appendix B :

DDC contents for GS790

Hitachi CRT :

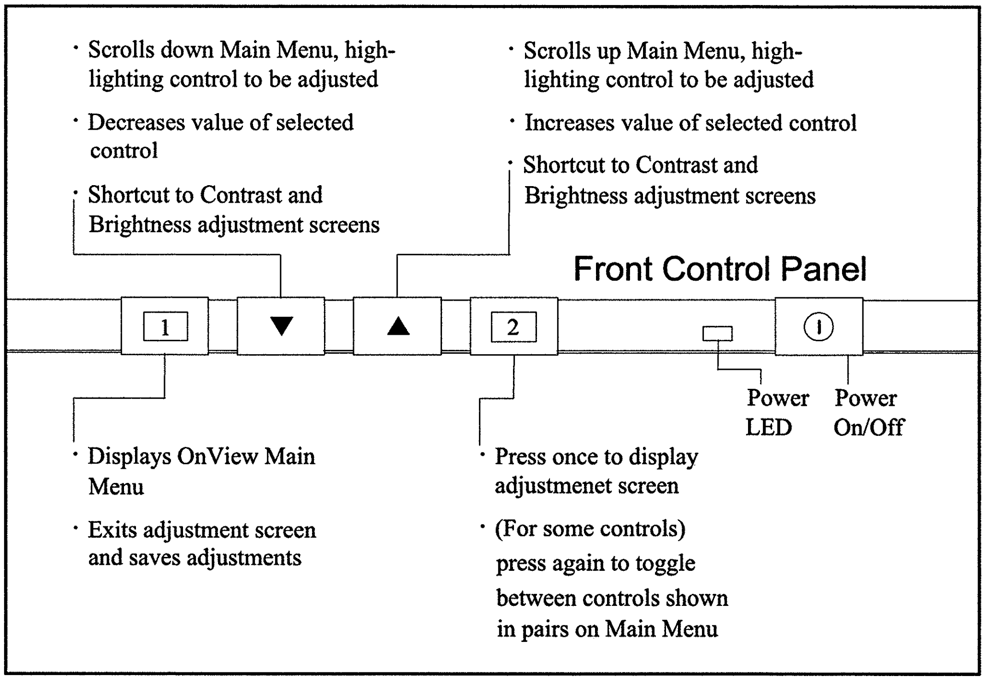
128 bytes of EDID code.

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10	4D	4F	0F	00	00	00	0A	09	01	02
20	1D	24	1D	B0	EB	00	B8	A0	57	49
30	9B	26	10	48	4C	FF	FF	80	31	59
40	45	59	61	59	71	4F	81	4F	81	59
50	81	99	A9	4F	86	3D	00	C0	51	00
60	30	40	40	A0	13	00	61	0C	11	00
70	00	1E	00	00	00	FF	00	4D	4F	39
80	31	30	30	30	30	31	35	0A	20	20
90	00	00	00	FD	00	32	A0	1E	61	0E
100	00	0A	20	20	20	20	20	20	00	00
110	00	FC	00	47	53	37	39	30	0A	20
120	20	20	20	20	20	20	00	C7		

2. OSD (on screen display) Function Control

- Main Menu 1
  - Contrast / Brightness
  - H. size / Position
  - V. size / Position
  - Pincushion / Balance
  - Trapezoid / Parallel
  - Top /Bottom Hook
  - H / V Focus
  - Tilt
- Main Menu 2
  - Degauss
  - H/V Moire
  - Viewmatch color
  - Video Level
  - Language
  - OSD Position
  - Viewmeter
  - Memory Recall

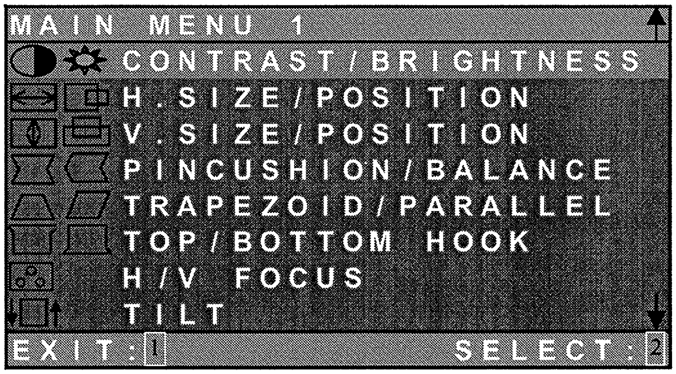
Front Control Panel for GS790



Using the Front Control Panel to access OnView screens

1. To turn the monitor on, press the Power button (shown above).
2. To display to OnView Main Menu, press button [1] .
3. To select a user control, press the ▼ or ▲ button repeatedly until the control is **High lighted.**
4. To display an OnView adjustment screen, press button [2] .
   Some controls are grouped in pairs on the Main Menu (see page 12). Press button [2] to toggle between them.
5. To adjust the selected user control, press the ▼ or ▲ button.
   Exception: For user controls that do not require adjustments, press button [2] again to activate. (examples: Degauss, Memory Recall).
6. To save your adjustments and exit all screens, press button [1] *twice*.
   The screen will clear automatically about 30 seconds after the last control button you press. To return to the Main Menu, repeat step 2.

Main Menu, Part1



CONTRAST/BRIGHTNESS:

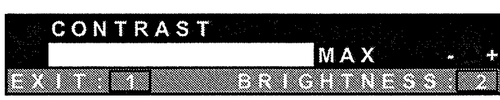
With CONTRAST/BRIGHTNESS highlighted on the menu, press button [2] again to toggle between BRIGHTNESS and CONTRAST.

CONTRAST

Adjusts the foreground white level of the screen image. [▲]increases the contrast of the image. [▼] decreases the contrast of the image.

Shortcut:

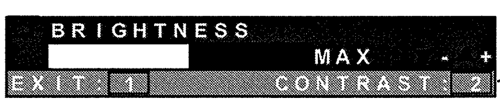
You can also display the CONTRAST control screen by pressing either [▲] or [▼] before displaying the main menu. From the CONTRAST control screen, button [2] goes to the BRIGHTNESS control screen.



Button 〔2〕 toggles to the BRIGHTNESS control screen.

BRIGHTNESS

Adjusts the background brightness of the screen image. [▲] increases the brightness of the screen image. Decreases the brightness of the screen image.



Button 〔2〕 toggles to the CONTRAST control screen.

H. SIZE/POSITION:

With H.SIZE/POSITION highlighted on the menu, press button [2] again to toggle between HORIZONTAL SIZE and HORIZONTAL POSITION.

TOP /BOTTOM HOOK

With TOP HOOK highlighted on the menu, Press button [2] again to toggle between top hook and bottom hook

TOP HOOK

Straightens the top corners of the screen image. [▼] or [▲] to adjust.

BOTTOM HOOK

Straightens the bottom corners of the screen image. [▼] or [▲] to adjust.

H. / V. FOCUS

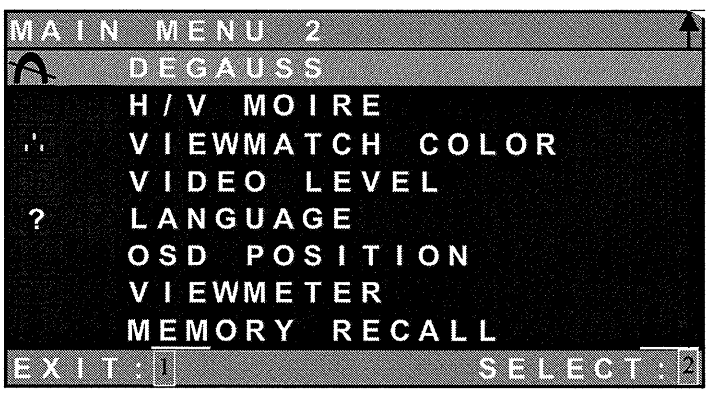
H. FOCUS fine tunes the horizontal line focus only. Press [▼] or [▲] to adjust

V. FOCUS fine tunes the vertical line focus only. Press [▼] or [▲] to adjust

TILT

Rotates the entire screen image. [▲] rotates the screen clockwise, [▼] rotates the screen counter-clockwise.

Main Menu, Part 2



DEGAUSS

Removes the build-up of magnetic fields that can affect color purity and convergence. Press the button [2] to degauss.

H/V MOIRE

With H/V moire highlighted on the menu, Press button [2] again to toggle between H-moire and V-moire.

H MOIRE

The control adjusts for horizontal lines caused by interference between the CRT and focus gun. [▼] decrease the amount of adjustment, [▲] increases the amount of adjustment.

V MOIRE

The control adjust for vertical lines caused by interference between the CRT and focus gun. [▼] decrease the amount of adjustment, [▲] increases the amount of adjustment.

Model name : ViewSonic GS790

OSD diagnostic message format

1. When power is turn on momently but no signal input then show :

PLEASE CHECH SIGNAL

2. If monitor into DPMS mode will show :

DPMS STANDBY MODE	DPMS SUSPEND MODE

DPMS OFF MODE

3. If input H-sync or V-sync over range well show :

FREQENCY OVER RANGE

3. Circuit Description

3. CIRCUIT DESCRIPTION

3.1 POWER SUPPLY(switching mode power supply fly-back type)(IC101)

The raw DC B+ voltage is got from AC input voltage after CR101 rectifier. It supplies lower voltage VCC to PWM controller, IC101 (KA2S1265), through start-up circuit (R104, R120, ZD101, Q102, D113). IC101 is synchronous by T103/Q105/Q109/C110 switching frequency. In order to meet E2000 power consumption specification, during power off mode, IC102 is turned off and Q116 is turned on. It can pull low IC101 pin4 feedback signal to forced power supply shut down. High-frequency & High-Voltage square wave-form is across the primary winding and transfers energy to the secondary. The output DC voltage gets after rectifying and filtering.

In order to have a stable and regulated output voltage while AC input voltage and output load change. IC203 will produce a current change through IC104 couple a voltage change on IC101 pin4. PWM controller circuit will change duty cycle and maintain stable voltage.

The PWM controller IC101 is started up from the raw B^+. The lower voltage VCC is provided by T101's AUX-Winding(pin1) through R151, D105, C108, SW101 to IC101 pin3.

The 198V in TP201 can be determinate by R211,R212,R223, VR201
(Vo=2.5 * (R211 + R212 / VR201 + R223).

Degauss CKT : When the power is turn on or press manual degauss let IC303 pin13 will high to turn on Q209 and RL201, degauss will active about 4 second.

3.2 POWER SAVING

According to E2000 agreement with monitor manufacturer is as the following table:

SYNC. INPUT	H. & V. PRESENTED	NO H. OR V.	NO H. AND V.
MODE TTL SIGNAL	NORMAL ON	STAND-BY SUSPEND	POWER OFF
SW1	Hi	Lo	Lo
SW2	Hi	Hi	Lo

LED	Green	Amber	Amber
Power (Watt)	Normal	< 15W	< 3W

SW1 : IC301 pin24, suspend (SUS)
SW2 : IC301 pin23, power down (PD)

- The suspend mode occurs when SW1 is at low level.
  The 15V, 12V, -15V are switch off via Q201 Q202 / Q205 Q206.

- The power-off mode occurs when SW1 and SW2 are at low level.
  The switchine power is turn off and all output are at low output.

- The micro-processor IC301 are drived to power off mode when signal cable is not connected to PC.

3.3 MICRO-CONTROLLER UNIT (MCU)(IC301)

IC301 is a 8-bit micro-controller (D1678P40) with 16K byte ROM memory, which play a main role of the digital control monitor. It performs as mode timing detector, key control scanner and controller, DPMS power saving handling, on screen display programmer and auto-alignment geometry controller pin16/17 are for key control. Pin1/40/39 are for s-correction switch control.by IC303 Pin8/9 are for Horizontal and Vertical sync. input respectively. Pin6/7 is the V-sync. and horizontal-sync output to pin14/15 of IC401. Pin39/38 are serial clock and serial data (SCL/SDA) bus communicate with IC302(EEPROM) pin6/5. Pin16(DSDA)/17 (DSCL) are as a port to communicate with DDC 1/2B access and auto alignment port. by signal cable. Pin21(U-SDA)/ 22(U-SCL) /20(U-INT) are USB bus.

3.4 SYNC. PROCESSOR

The horizontal sync. is connected from signal cable to IC301(MCU) pin8 input and from IC301 pin7 output positive polarity sync to IC401 pin15.

Vertical sync. is connector from signal cable to IC301(MCU) pin9 input comes out at pin6 a positive polarity sync to IC401 pin14.

The IC301 and the IC401(TDA4856) sync input can handle either composite or separate sync input.

3.5 DEFLECTION CIRCUIT

3.5.1 Horizontal Synchronization Processing

The horizontal synchronization processor is integrated inside the chip of IC401. It uses a dual phase-lock-loop (PLL1/PLL2) design. This operation ensures a smooth tuning and avoids fast changes of H-frequency during catching.

The processor can synchronize with the input sync. up to triple of free-run frequency which is determined by R408, R409 and C407.

The PLL1 phase detector circuit is used to control the oscillator frequency and maintains it in proper frequency and phase with the incoming sync signal. One input is coupled from output of VCO that is built inside the IC.

A loop filter with a properly selected time constant (C406, R407) is connected at pin26.

The PLL2 circuit is used to compare the line flyback pulse at pin HFLB with the oscillator sawtooth voltage, to compensate the delay in H-deflection by adjusting the PHASE of HDRV. One input is from the output of VCO (which is inside the IC) and a second input (pin1 of IC 401) is from Q415 collector pulse via C483, C484.

The control voltage formed through loop filter is to control horizontal output pulse output at proper duty cycle and maintains the phase between raster and picture.

3.5.2 Horizontal Driver Stage

The horizontal drive pulse from pin8 of IC401 is applied to the base of driver MOSFET Q4125. B^+ is provided by the regulated 15V-voltage source via R446, R446 and C424. The output of driver transformer T401 is coupled to the base of Horizontal output Transistor Q415. R441 C442 compose of damping network, which is to eliminate the leakage flux of T401 during Q412turn off.

3.5.3 Horizontal Scanning and High Voltage Power Supply Circuit

The horizontal scanning is accomplished by Q415, D410, C428, DY (P401). Except the basic horizontal scan output, Linearity coil T403 corrects the asymmetrical distortion. (C427/C432/C434/C435/C436/C437/C438) are S-Correction capacitors, Q420/Q421/Q422/Q423/Q424 switched on/off according to different H-frequency.

The conducting period of damper diode D410 completes the first half part of horizontal scan. The conducting period of horizontal output transistor Q415 completes the second half of scan.

The retrace capacitor is C428, the charge and discharge actions of retrace capacitor via yoke after Q415 turned off, which is designed for the same resonant frequency with the main scan circuit.

In the high voltage drive circuit, the output of Q401 is applied to the primary winding of flyback transformer (FBT) T401 and drives the flyback transformer to supply CRT anode voltage of about 25.8KV during retrace period. T402 pin6 voltage (B+) steps down by IC402, Q402. Feedback components are C416, R425 and VR402.

Several driven power sources are developed in the FBT secondary, including 40Vp-p: XPR pulse (pin10), -130Vp-p: G1 negative pulse (pin4), 400Vp-p: V Focus VCC (pin3).

3.5.4 Buck Converter and width control

In order to maintain same scan width (raster) within 30KHz-95KHz or 30KHz-86KHz, the scan supply B+ tracked with continuos H-frequency is necessary, and the design is implemented by a convention method-of buck converter. The buck converter mainly composes of a P-channel MOSFET (Q408), choke T402 and rectifier diode D409.

The PWM control circuit is integrated in IC401 pin5 is inverting, pin3 is output of error amplifier, both for frequency compensation and gain setting. PWM pulse width output at pin6 is modulated according to internal error amplifier output. Pin4 current sense is controlled by Q403, R431, ZD401 and R432 for horizontal size width limitation.

3.5.5 The Pincushion/Trapezoid/Top Hook/Bottom Hook Correction

The voltage across R418 can be varied in accordance with a vertical parabolic or sawtooth waveform, which is generated by IC401 pin11. The peak yoke current is decreased in proportion to the feedback of R418, as the voltage across R418 is changed for compensating the pincushion, trapezoid and Hook effect. The waveform is adjust by IC301 SCL SDA control IC401 pin18 pin 19.

3.5.6 PARALLEL and PIN-BALANCE CONTROL

Parallel CKT is superimposed the vertical sawtooth current inside of IC401 the waveform amplitude is adjust by IC301 SCL SDA control IC401 pin18 pin 19.

Pin-balance CKT is superimposed the vertical parabolic current inside of IC401 the waveform amplitude is adjusted by IC301.

3.5.7 X-RAY-RADIATION PROTECTION

The X-Ray-radiation protection circuit usually uses in the monitor latching type circuit. Therefore, should a fault occur which would activate the X-ray protect circuit, Should a fault occur which would cause the high voltage to increase above a predetermined level, the positive pulse at pin7 of the FBT (T404) would go more positive. This will increase the voltage applied to ZD405 to exceed its breakdown voltage for a certain time. An latch circuit Q434 Q435 switches the IC404 pin1 into protection mode. Shutting down the IC404 and Q437.

NOTE: The X-RAY-Radiation protection circuit used in this monitor is a latching type the monitor will shut down and continue until turn-off the monitor by power switch.

3.5.8 Vertical Deflection (IC501)

Vertical deflection function is operated in the IC401, IC501 that mainly contains the oscillator, ramp generator, power output amplifier and flyback generator. Vertical oscillator is obtained amplifier by means of and integrator driven by oscillation circuit that is determined by C402, C403 and R406. The vertical sync signal is applied to the pin14 of IC401. Once the sync signal synchronized a clock pulse is generated inside this chip. The clock pulse is just as a sync input of ramp generator. A liner voltage ramp is produced at pin12,13 of IC401, and is couple to IC501 pin1,7 for vertical output amplitude Vertical output amplitude is controlled by R502/R505, IC401 inside parameter and IC301 Vert. size DAC.

The CKT of the TDA8172 provides a high CMRR current driven differential input (pin1,7), the output stages (pin3,5) in a full bridge configuration, a flyback generator, a protection CKT for the output stage and a guard CKT.

The pin5 is the output of the power amplifier and it drives the yoke by a current driven in opposite phase current ramp. Pin2 is the supply voltage 15VDC, Pin4 is supply voltage –15VDC, the pin3 is the feedback pulse feedback to pin6.

Vertical frequency is 100~180Hz, Q401 off so vertical free run is only determined by C402. If vertical frequency is 50~100Hz, Q401 on so vertical free run is determined by C402 + C403. Total vertical frequency range is from 50Hz to 180Hz.

Vertical centering is controlled by changing the DC voltage at vertical output that is caused from the DC shift of IC401 pin13, and that can be adjusted by DAC control of IC301.

3.5.9 FOCUS

Horizontal parabolic wave form the IC901 pin7(M52723ASP) Sync trigger by the pin17 of IC901. IC901 pin7 is horizontal parabolic O/P to drive Q902, Q903 and Q904 via T405 pin7 coupling to FBT pin13. Vertical parabolic waveform is taken from Q904 via T405 pin1 to FBT pin13. IC901 pin6/pin15 can control IC901 pin7 amplitude/phase by IC301 pin32/pin31.

3.5.10 TILT

Tilt CKT is operated a current of different direction on rotation coil. The IC301 pin33 output 0~5V to IC701 pin2 to control the volt amplitude and polarity on IC701, IC701 pin1 output via Q701 Q702 to drive rotation coil.

3.6 VIDEO

3.6.1 VIDEO AMPLIFIER (IC601)

The video amplifier module is composed of three amplifiers for red, green, blue channel.

The video input signal is fed to the video preamplifier IC601 (M52743BSP) (pin2 blue, pin6 green, pin11 red) through AC coupling capacitor C603, C604, C658.

The clamping pulse comes from IC301 pin28 to IC601 pin19. The blanking pulse come from P602 pin9(HBL) and P604 pin3(VBL) to IC601 pin27.

IC602 is an integrated high voltage CRT driver circuit designed to drive R.G.B channel of CRT

3.6.2 On Screen Display (OSD)(IC603)

IC603 (MTV021N-25) is a on screen display generator. Pin5 for H-sync input, pin10 for V-sync input. The IC603 is controlled by IC301 via P604 ISCL, ISDA to IC603 pin7, pin8.

The on screen display signal is output from pin12(B), pin15(G), pin14(R), pin13(B)connected to mixer circuit of IC601 pin1, pini4, pin13, pin9.

3.6.3 Auto Beam Limit CKT (A. B. L. CKT)

When beam current over 870uA by VR401, the voltage build at base of Q601 will be less then 3.5V, then the voltage of pin15 of IC601 will be pulled down accordingly to reduce the video preamplifier gain output.

3.6.4 Brightness Control

Brightness (G1) is controlled by varying the DC voltage of VR601 and the IC601 pin23 (DAC) voltage.

3.6.5 Blanking CKT

From IC301 pin6 and IC501 pin6 vertical blanking pulse are fed to the base of Q501 and via P604 pin3. The blanking pulse O/P is coupled to horizontal blanking pulse by Q614. Horizontal & vertical blanking pulse are fed to IC601 pin27 and let video O/P Amp cut off during the period of horizontal retraces. While mode change. IC301 pin15 will pull high to turn on Q612 (mute function) and Q613 will be off. The G1 volt will down to -130V then CRT will cut off the video output.

3.6.6 CONTRAST, GAIN & BIAS CONTROL

The IC601 contains three gated single ended input black level clamp compurgators for brightness control, three matched DC controlled attenuators for contrast control, and three DC controlled sub-contrast attenuators providing gain trim capability for white balance.

All the DC control voltages are comes from IC601 internal (DAC) is controlled by IC301 Micro controller via a serial bus. The IC601 DAC output pin24, 25, 26 for G.R.B (BIAS) controller.

3.6.7 DDC1/2B

IC604 (24LC21) can transmit continuously it's extended identification, "EDID" using DDC1 communication channel. In addition, the monitor can respond to a regrets for EDID, or complete VDIF, to be transmitted using DDC2, level B commands. Pin6

(DSCL) is clock input for DDC 2B, pin5 (DSDA) for data input. Pin7 (V-sync) is clock input for DDC1 through V-sync.

In DDC1 data transfer (UNI-directional mode) the V sync input pin is used as input clock for data transmission and SDA output pin as serial data line the SCL pin will hold high.

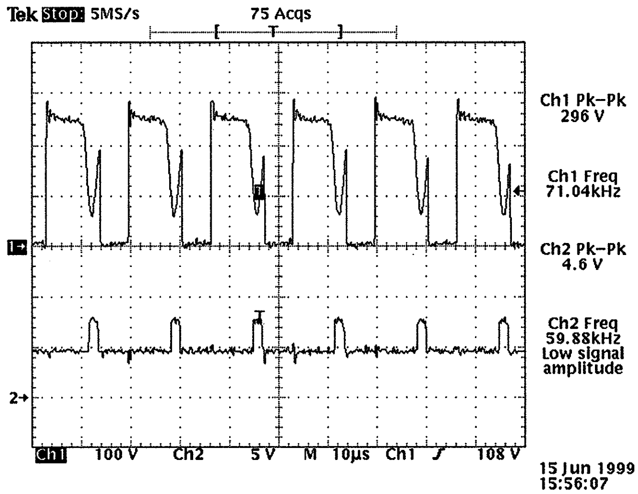
The DDC2B mode (BI - directional mode), BUS consists of two wires SCL is for the data transmission clock and SDA is for the data link.

DD-995 FC

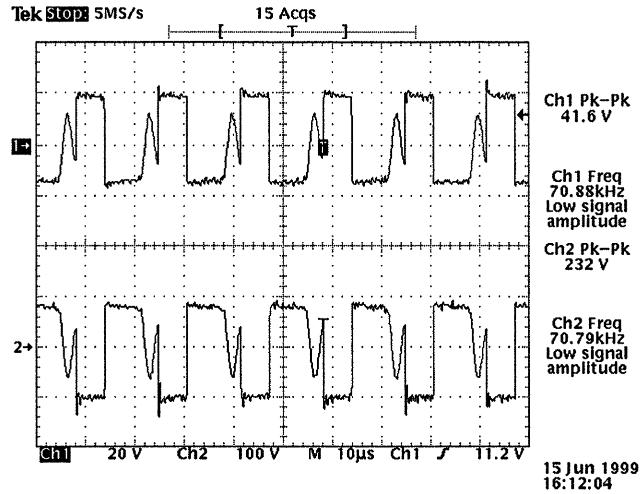
TEST CONDITION :

AC SOURCE : 110V ; TIMING MODE ; 60KHZ ; PATTERN ; FULL WHITE

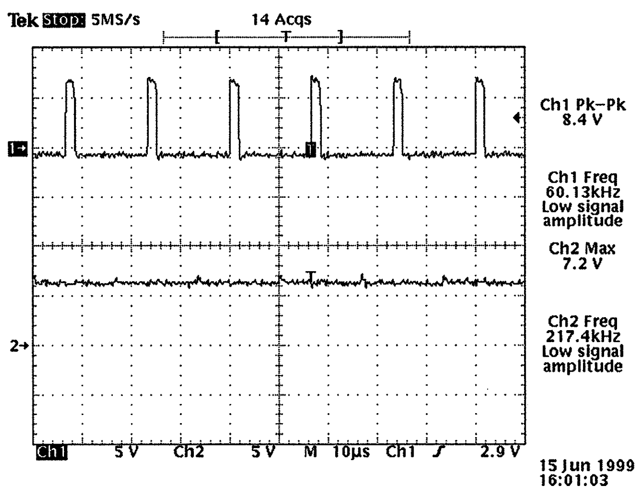
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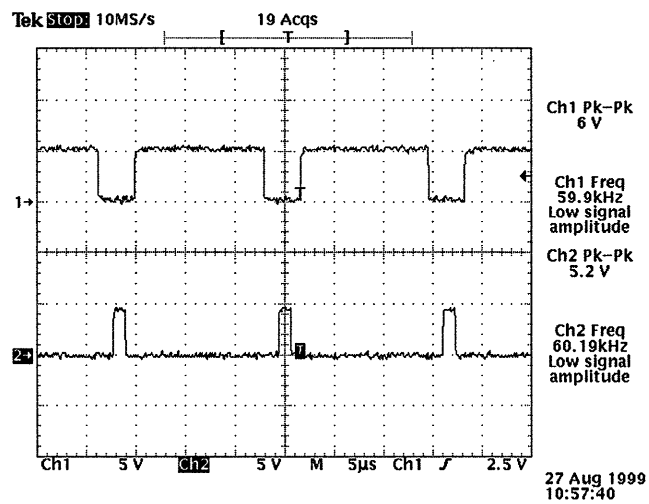
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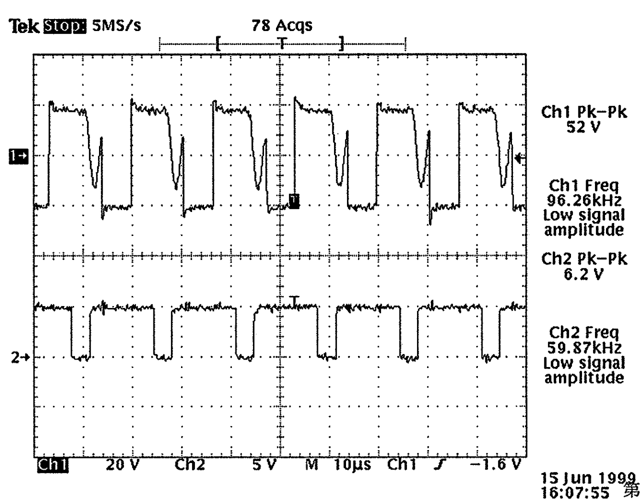
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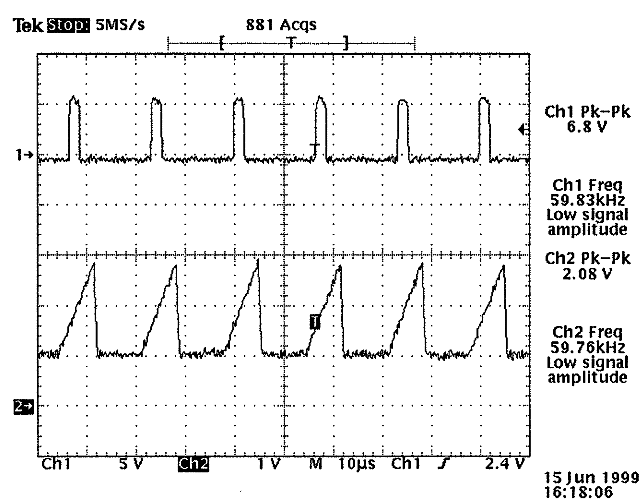


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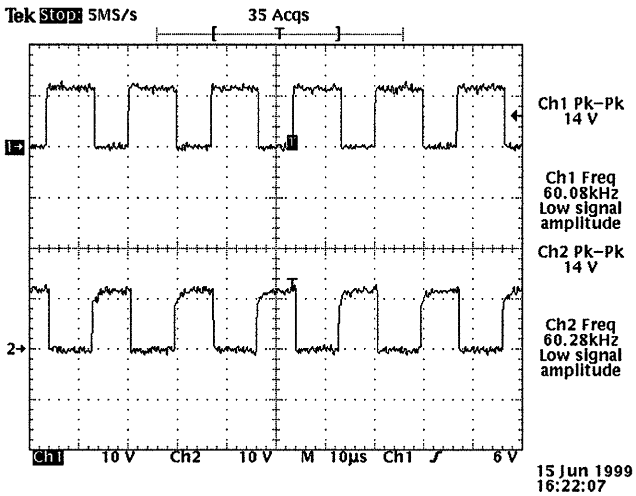


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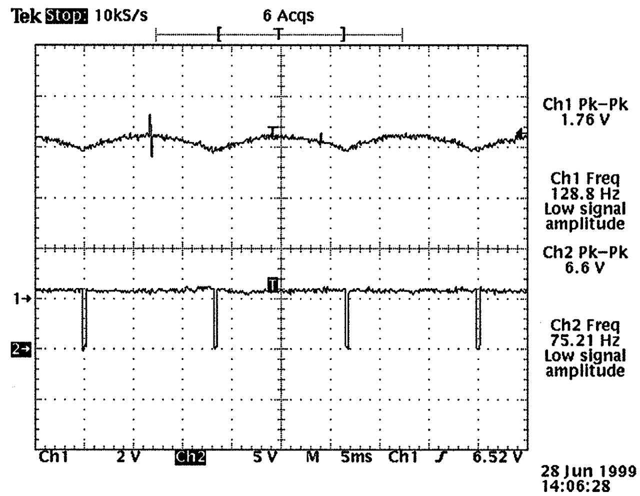
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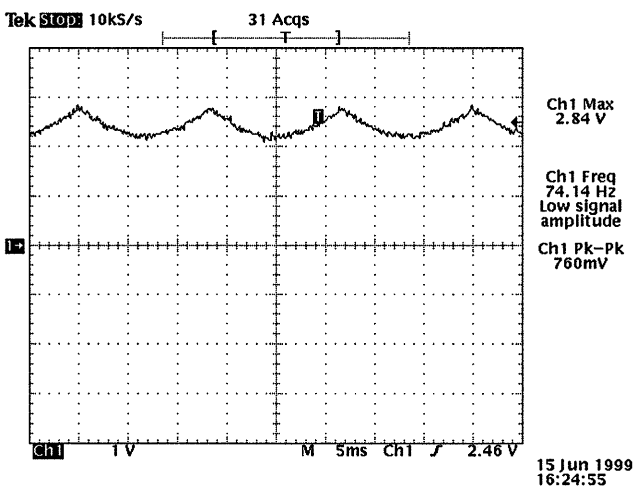
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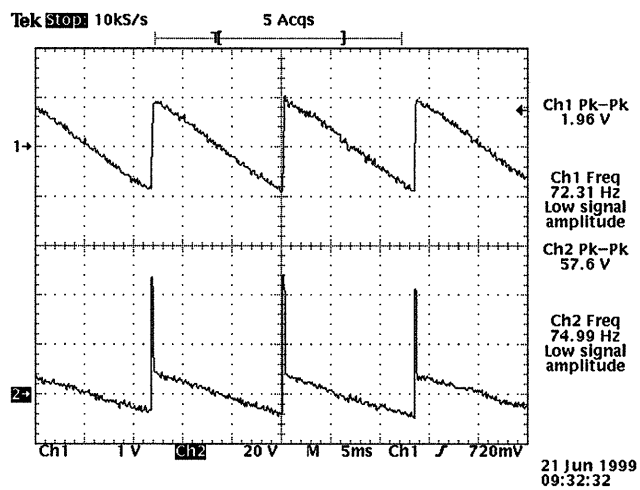
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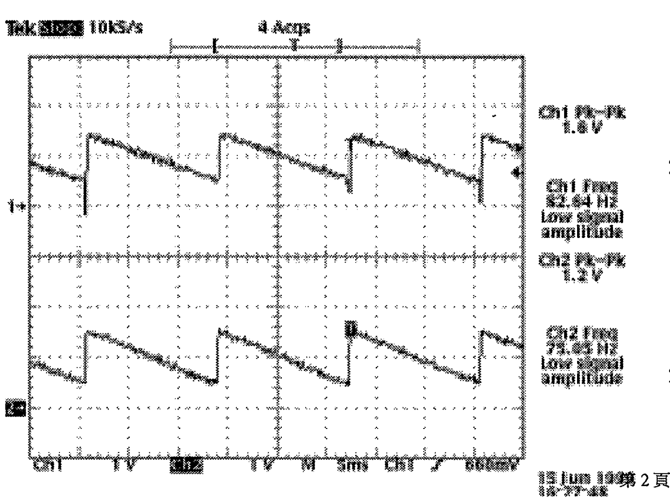
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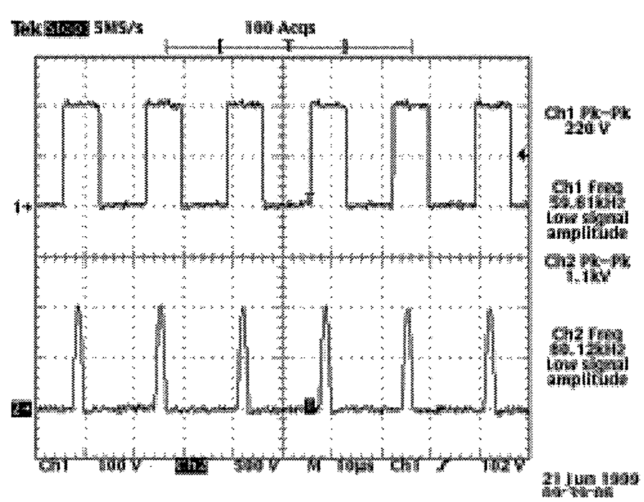
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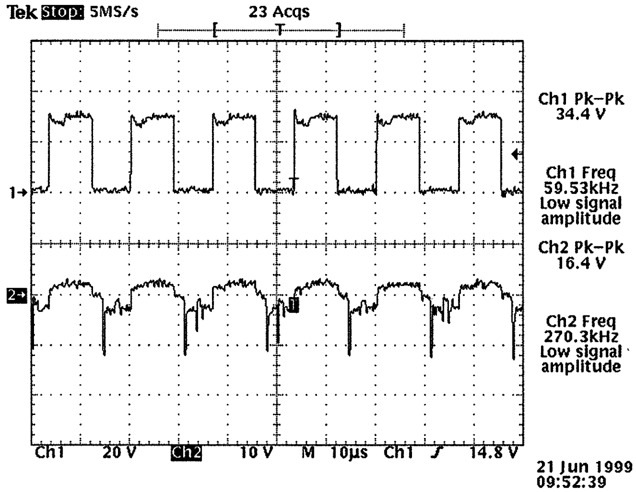
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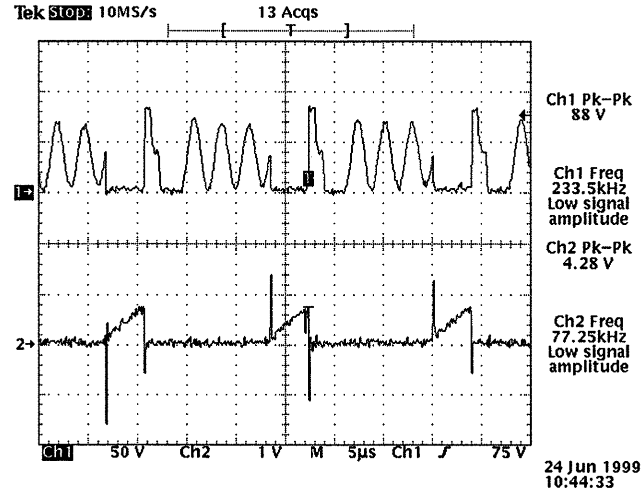
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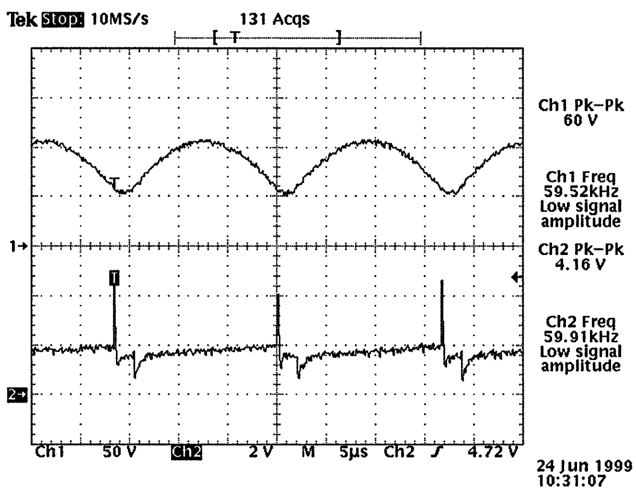
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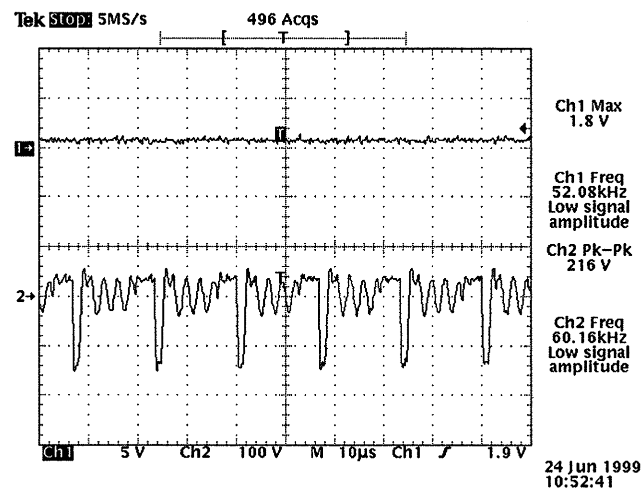
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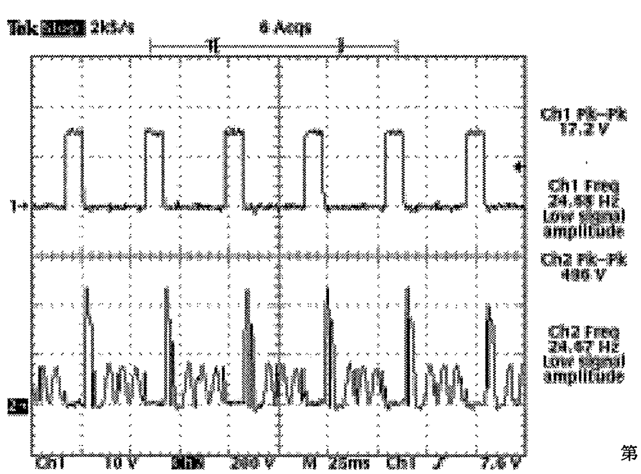
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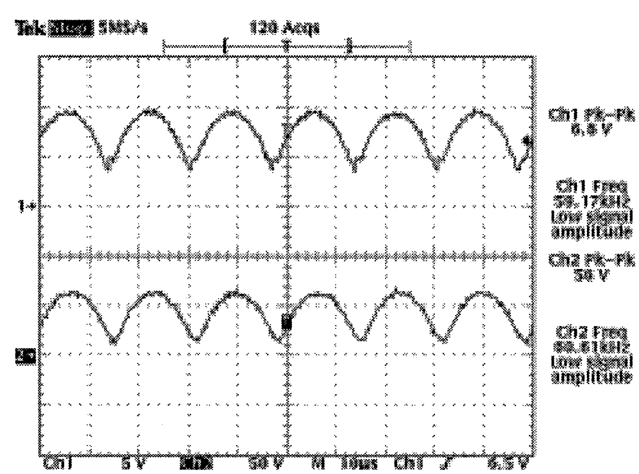
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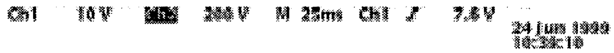
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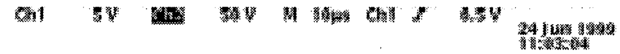


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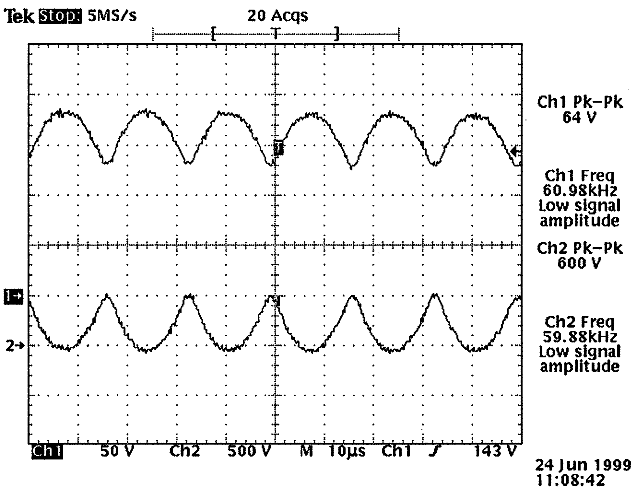


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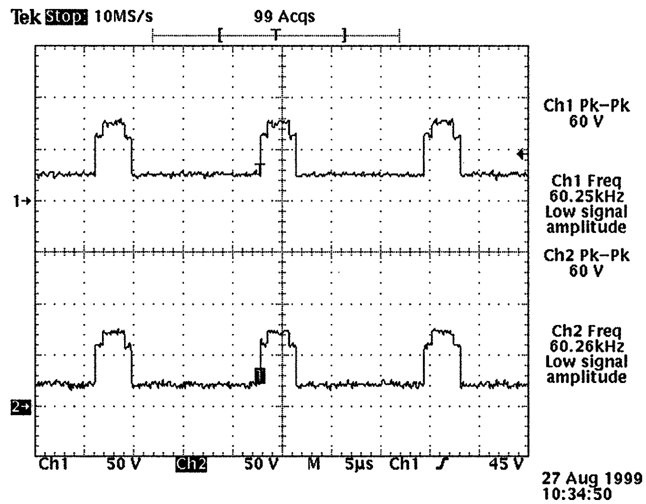




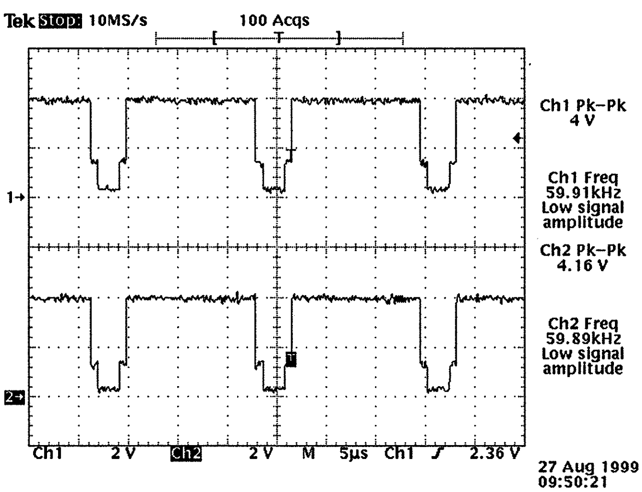
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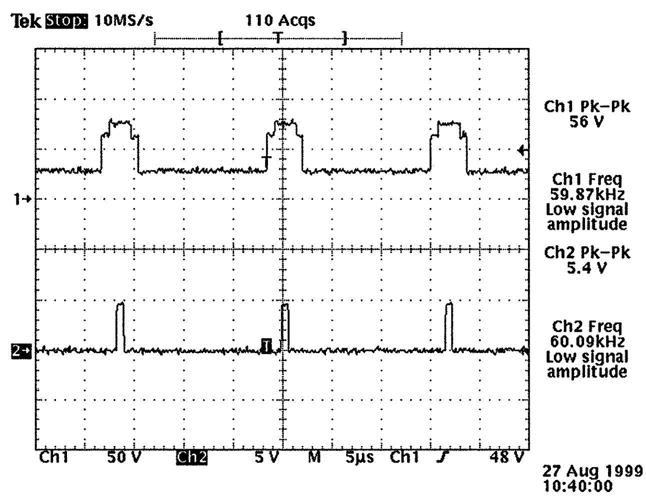
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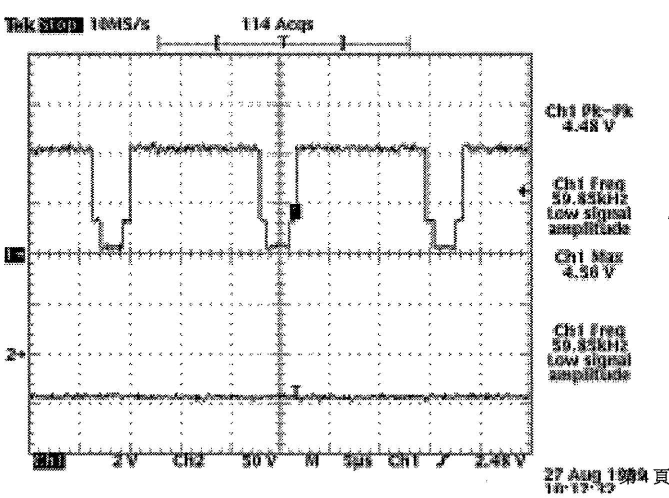
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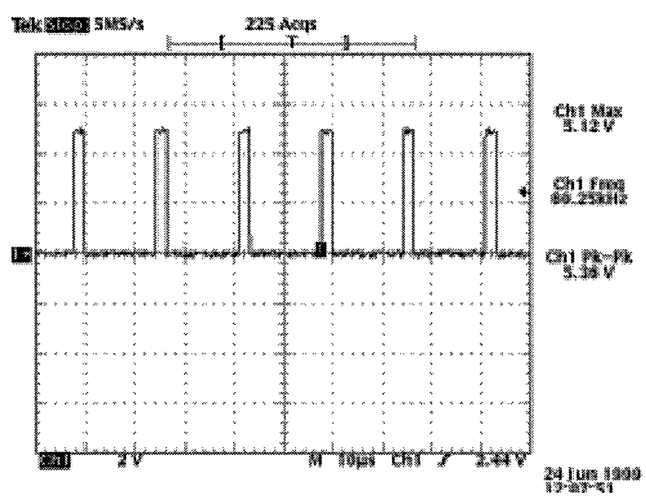
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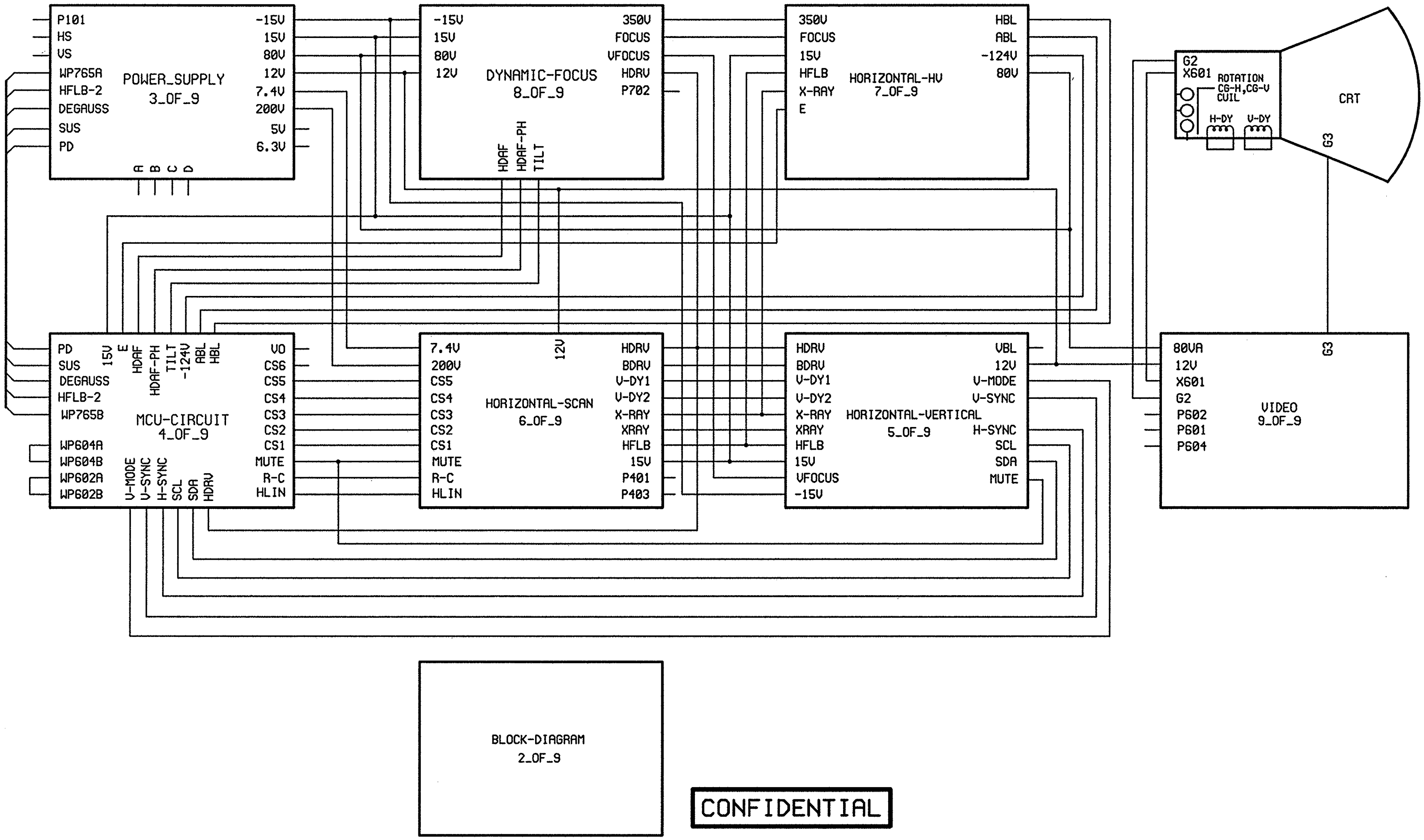


4.

Circuit diagram

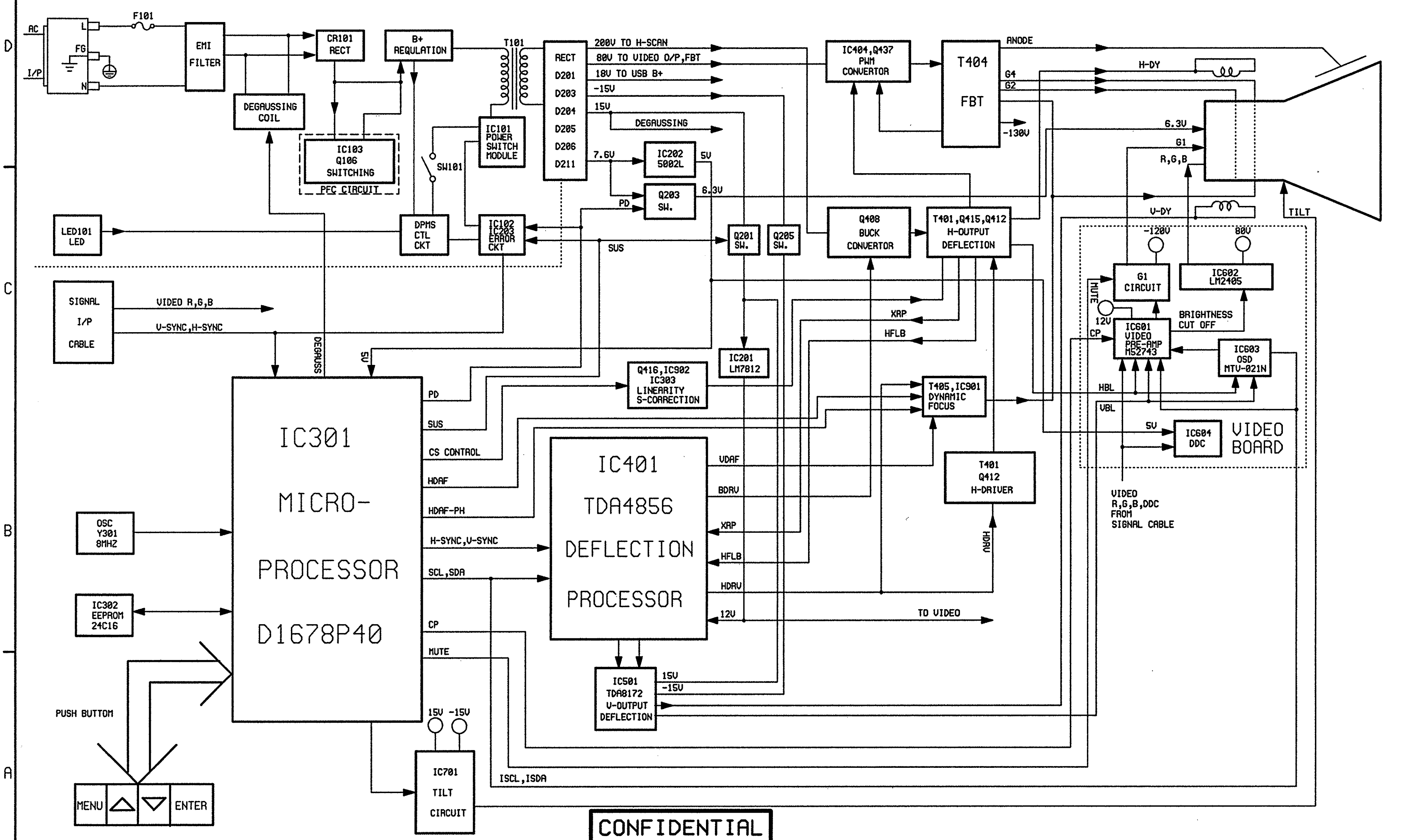
GS790 circuit diagram

GS790

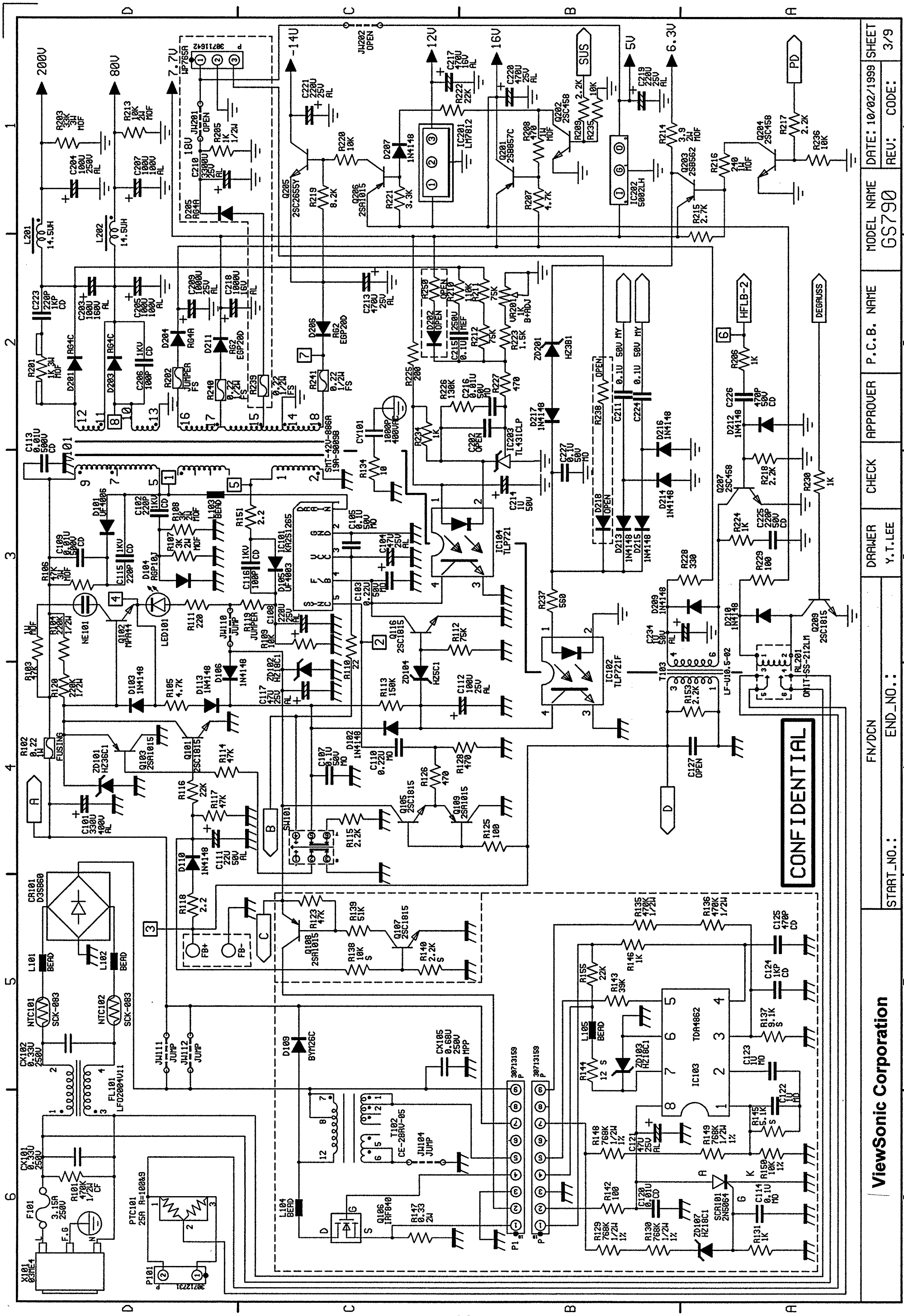


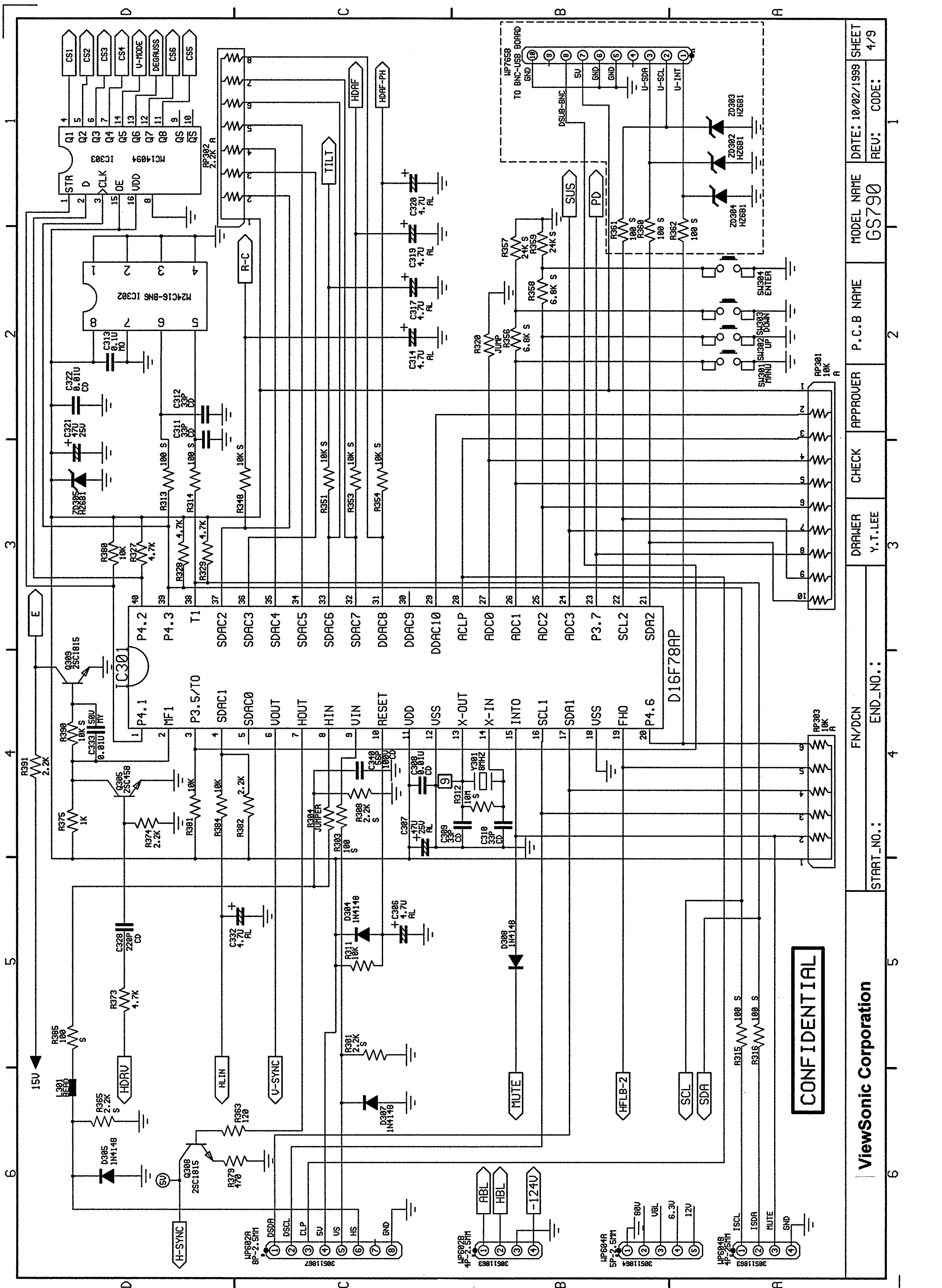
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	START_NO.:	END_NO.:	Y.T.LEE				GS790	REV: CODE:	1/9

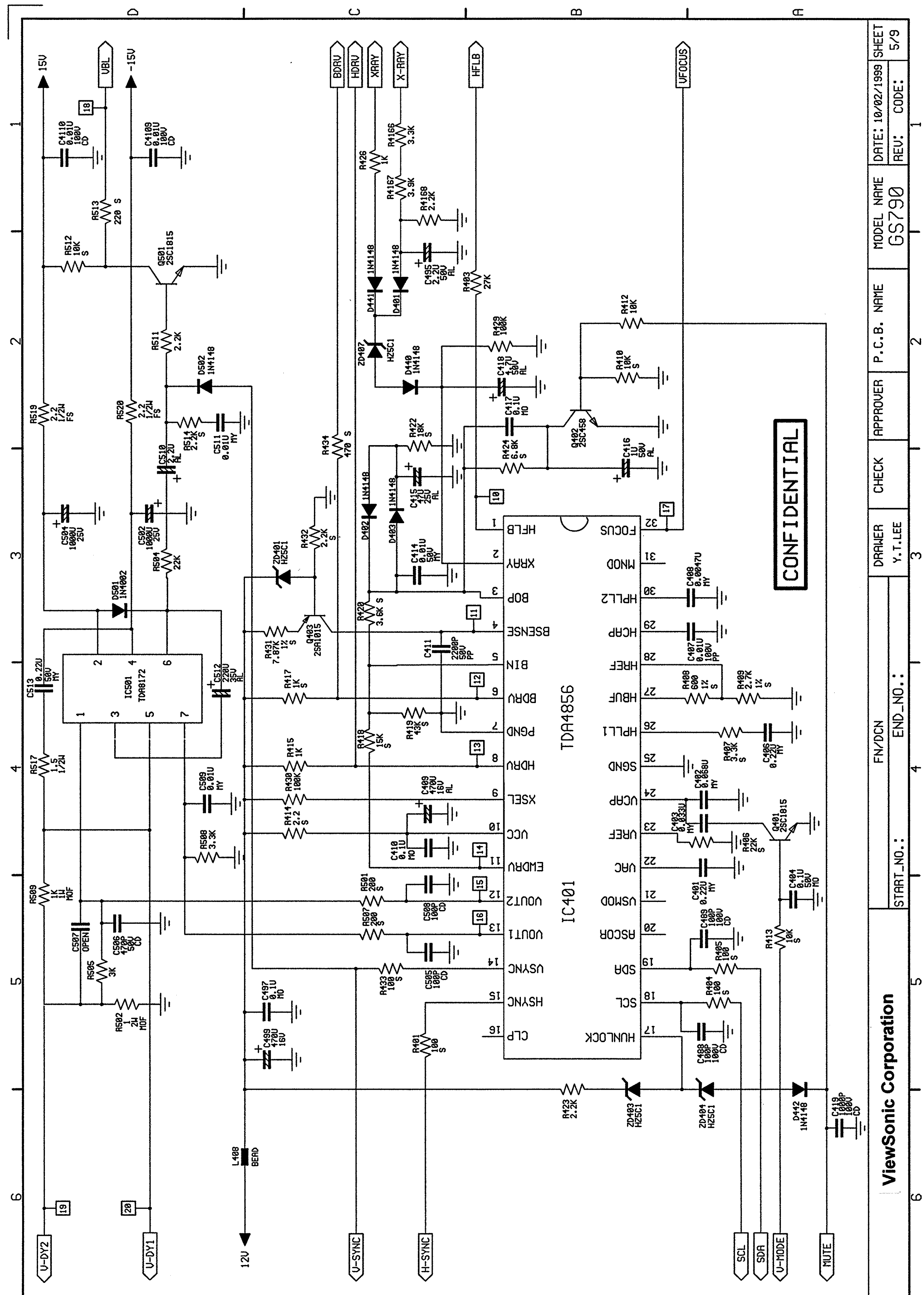
GS790 COLOR MONITOR BLOCK DIAGRAM

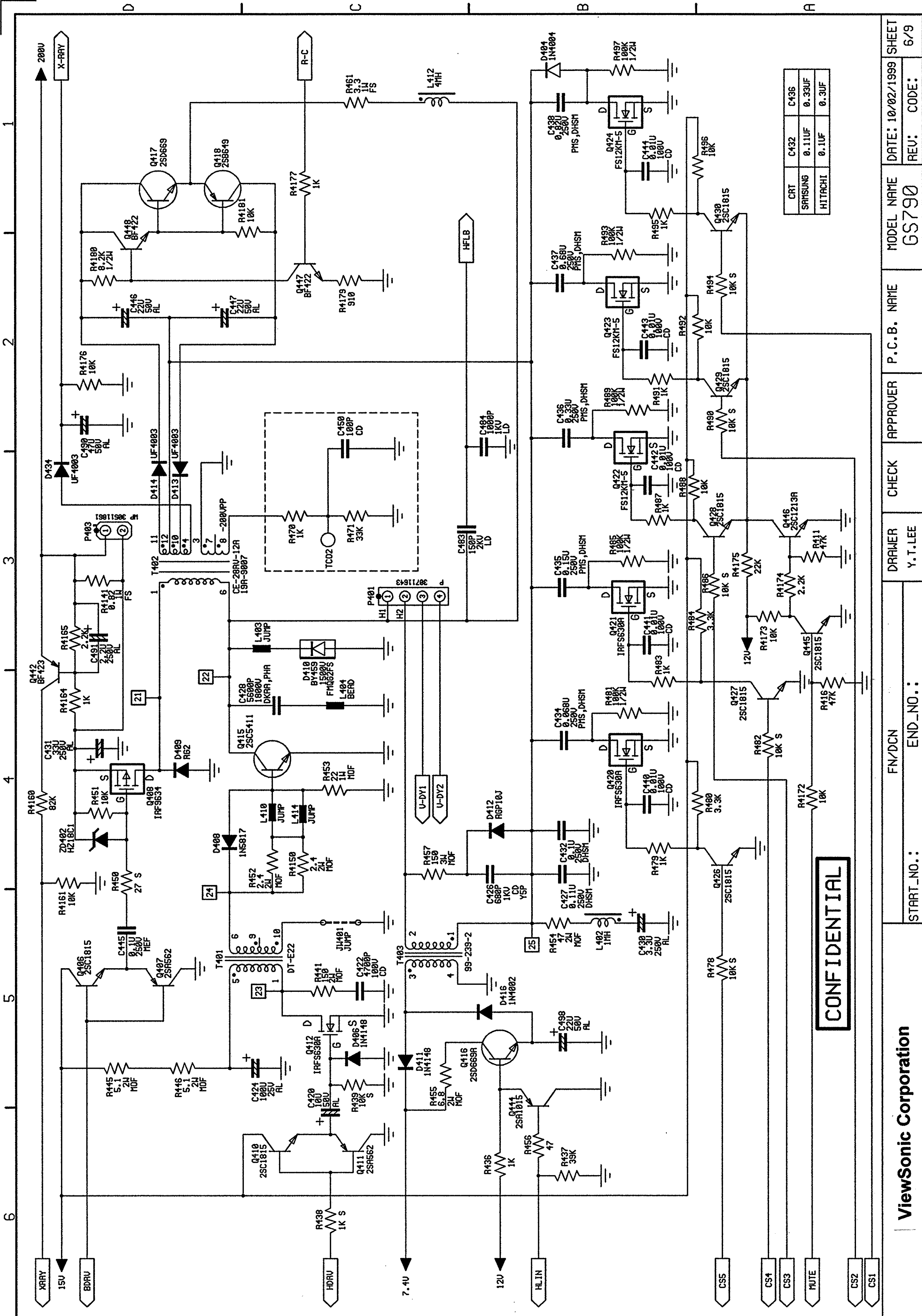


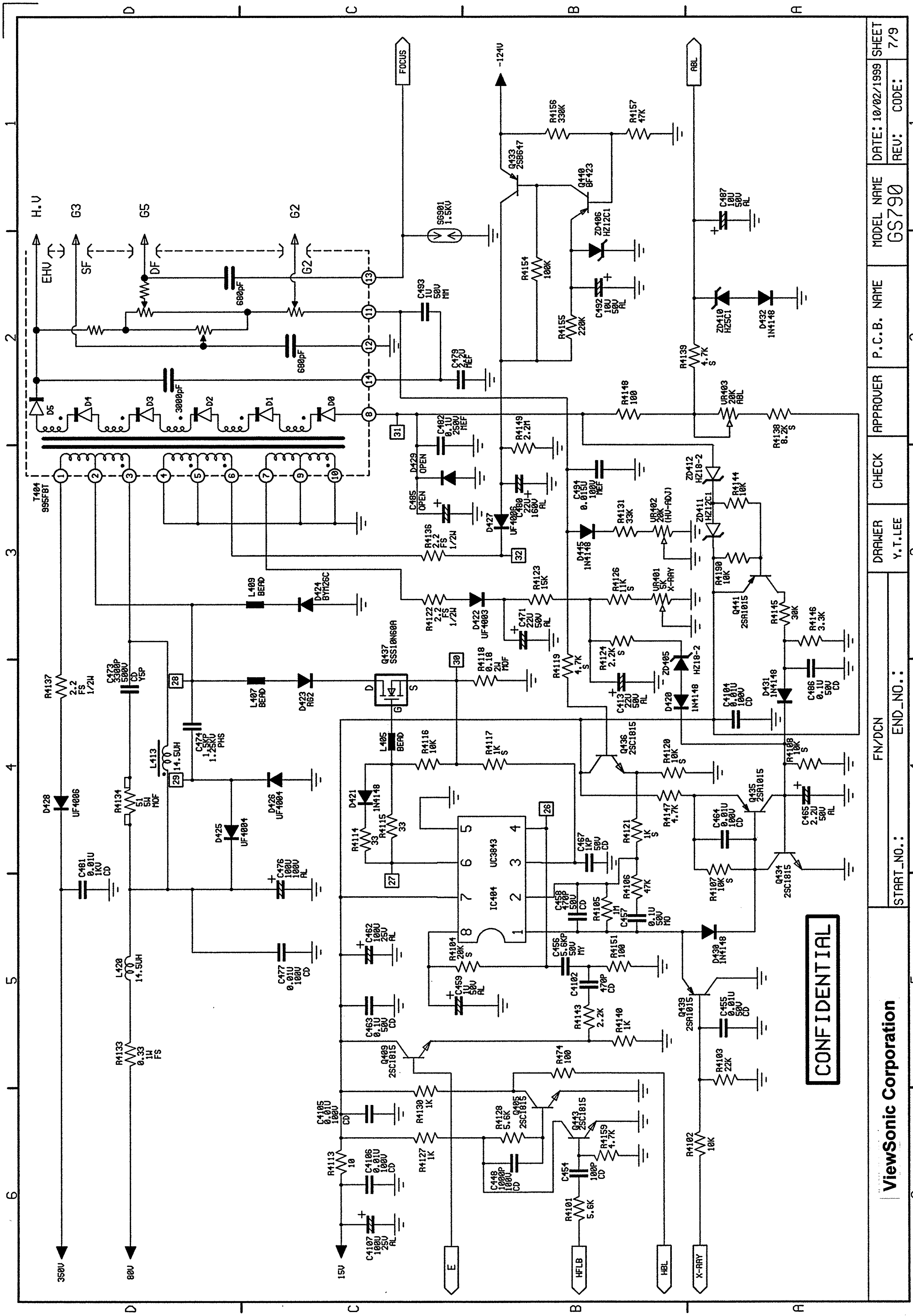
ViewSonic Corporation	FN/DCN		DRAWER	CHECK	APPROVER	P.C.B. NAME	MODEL NAME	DATE: 10/02/1999	SHEET
	START_NO.:	END_NO.:	Y.T.LEE				GS790	REV: CODE:	2/9

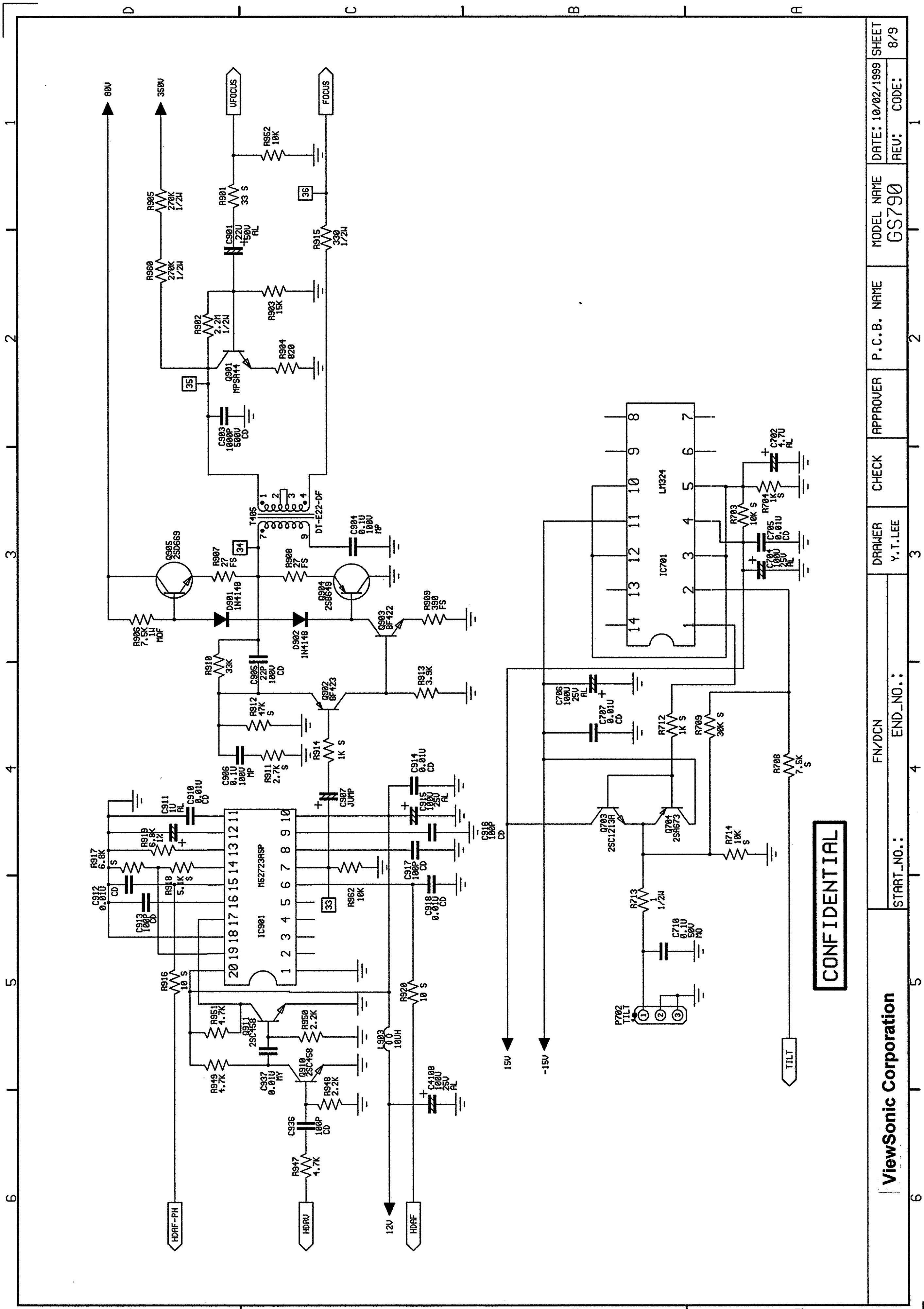

MODEL NAME GS790
DATE: 10/02/1999
SHEET 3/9
REV:
CODE:
P.C.B. NAME
APPROVER
CHECK
DRAWER Y.T.LEE
FN/DCN
START_NO.:
END_NO.:
CONFIDENTIAL
ViewSonic Corporation

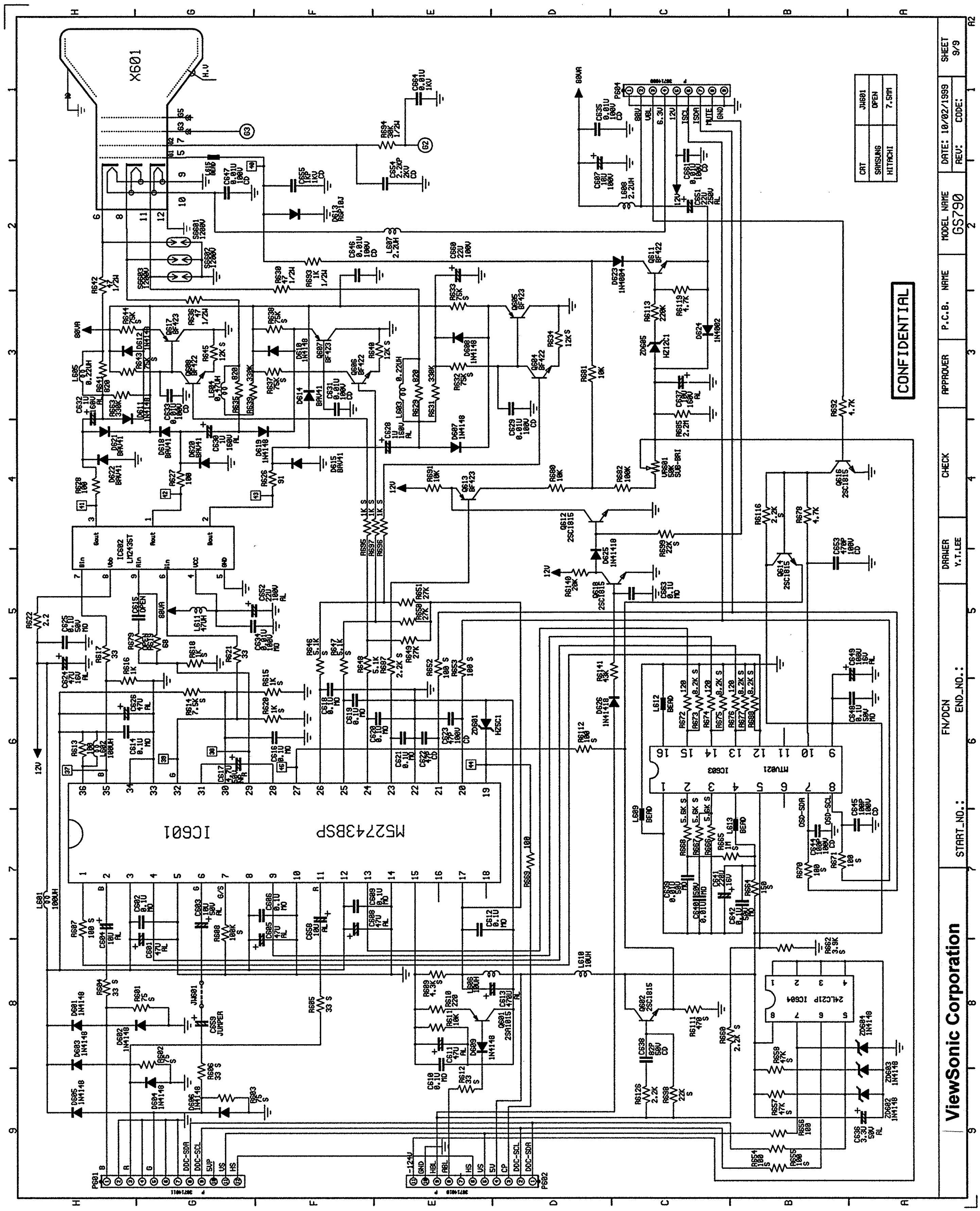

CONFIDENTIAL
ViewSonic Corporation
MODEL NAME
GS790
DATE: 10/02/1999
SHEET
4/9
REV:
CODE:
P.C.B NAME
APPROVER
CHECK
DRAWER
Y.T.LEE
FN/DCN
START_NO.:
END_NO.:
D16F78AP
IC301
M24C16-BN6 IC302
MC14094 IC303
TO BNC-USB BOARD


CONFIDENTIAL
TDA4856
IC401
IC501
TDA8172
MODEL NAME
GS790
DATE: 10/02/1999
SHEET
5/9
REV:
CODE:
P.C.B. NAME
APPROVER
CHECK
DRAWER
Y.T.LEE
FN/DCN
START_NO.:
END_NO.:
ViewSonic Corporation
15V
VBL
-15V
BDRV
HDRV
XRAY
X-RAY
HFLB
VFOCUS
V-DY2
V-DY1
12V
V-SYNC
H-SYNC
SCL
SDA
V-MODE
MUTE


CONFIDENTIAL
ViewSonic Corporation
MODEL NAME
GS790
DATE: 10/02/1999
SHEET
6/9
REV:
CODE:
P.C.B. NAME
APPROVER
CHECK
DRAWER
Y.T.LEE
FN/DCN
START_NO.:
END_NO.:
CRT | C432 | C436
SAMSUNG | 0.11UF | 0.33UF
HITACHI | 0.1UF | 0.3UF


DATE: 10/02/1999
SHEET 7/9
MODEL NAME
GS790
REV:
CODE:
P.C.B. NAME
APPROVER
CHECK
DRAWER
Y.T.LEE
FN/DCN
END_NO.:
START_NO.:
ViewSonic Corporation
CONFIDENTIAL
FOCUS
-124V
ABL
H.V
G3
G5
G2
EHV
SF
DF
T404
995FBT
UC3843
IC404
350V
80V
15V
E
HFLB
HBL
X-RAY


CONFIDENTIAL
ViewSonic Corporation
MODEL NAME GS790
DATE: 10/02/1999
SHEET 8/9
DRAWER Y.T.LEE
IC901 M52723ASP
IC701 LM324
T405 DT-E22-DF


ViewSonic Corporation
CONFIDENTIAL
MODEL NAME GS790
DATE: 10/02/1999
SHEET 9/9
DRAWER Y.T.LEE
IC601 M52743BSP
X601

5.

Adjusting procedure

A. General.

B. Instrument alignment.

1. Deflection presets.
2. Power supply alignment.
3. Size & geometry adjustment.
4. Video alignment / function memory recall.
5. Focus adjustment.

C. PCB defined.

D. Fixture function description.

General

1. All specification must be met over line voltage range of 90VAC to 264VAC 50Hz/60Hz unless other wise specified.
2. Operating temperature range is 0 DEG.C to 40DEG. C with a relative humidity of 10% or less to 95%.
3. The monitor must be operational in an unstable state within 30 section after turn-on.
4. All signal levels are measured assuming termination at the monitor's input jacks or in its characteristic impedance.
5. An ambient lighting level of 400 to 600 LUX is assumed when setting brightness for raster extinction threshold.
6. All purity related specifications must be met without external degaussing.
7. All controls must have excess range (No control may be left at an end stop when proper alignment is completed).
8. The monitor is not required to meet specs during the following but must tolerate, without damage to the CRT or circuits, Any sequence or combination of power on and off, signal on and off, unplugging of power or signal, erratic, Wrong frequency of inputs while at any possible settings of user accessible controls noisy
9. An isolation transformer should be used when performing alignment and tests. Portions of the power supply board are hot ground The remaining boards are cold ground
10. Discharge of CRT anode should be done only to CRT ground strap.
11. Geometric measurement are assumed to be made alone a straight surface with a flat rule or template.

A. Instrument alignment

1.Deflection presets

Control pots (VR201, VR401, VR402, VR403) are set at middle point. screen VR set to MIN.

2.Power supply alignment

2.1 Input VESA 1024x768 / 75Hz mode & cross-hatch pattern.

2.2 Adjust VR201 until voltage at TP201=198V± 0.2V.

3.Extreme high voltage alignment

3.1 Input VESA640x480 31.5KHz/60Hz mode & cross-hatch pattern.

3.2 Contrast 100%, brightness 50%.

3.3 Adjust VR402 let H.V=26.8 ± 0.1KV (GS790):

3.4 Adjust screen (G2 knob)let G2 POINT = 610±10VDC (GS790)

3.5 Set focus (G3 / G5 knob) to be distinguish.

Horizontal alignment

4.1 Raster centering

4.1.1 Input test signal VESA1600x1200 / 75Hz mode (GS790):

cross-hatch pattern.

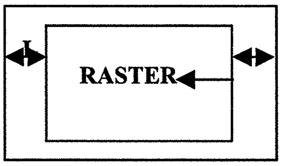
4.1.2 Contrast 0%, Brightness 100%.

4.1.3 Press select the OSD to "RCENTER".

4.1.4 Adjust "RCENTER" ▲/▼ to center raster on screen such that the horizontal distance from the left display edge to the left bezel edge is within 3mm of the distance from the right display edge to the right bezel

4.1.5 Edge.

| L-R | ≦



4.1.5 Change input test signal VGA 640x480 / 60HZ mode & cross-hatch pattern.

4.1.6 Select the OSD to "H-SIZE".

4.1.7 Adjust "H-SIZE" ▲/▼ to narrow the raster size on screen such that the horizontal distance at the right and left edge is within 5mm.

4.1.8 Adjust "RCENTER" ▲/▼ to center raster on screen such that the horizontal distance from the left display edge to the left bezel edge is within 3mm of the distance from the right display edge to the right bezel edge.

4.2 Picture centering

4.2.1 Input test signal VESA 1024x768 / 85Hz MODE & cross-hatch pattern.

4.2.2 Contrast 100%, Brightness 100%, cross-hatch pattern.

4.2.3 Adjust "H-PHASE" such that the picture is centered with the raster.

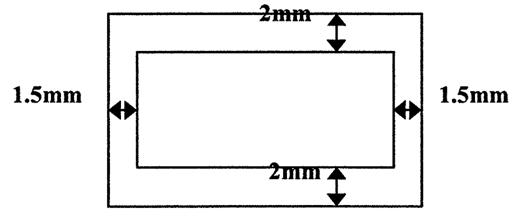
4.2.4 Adjust "H-SIZE" such that the picture size is 357mmX268mm.

4.3 Geometry distortion: PINCUSHION, PIN-BALANCE, TRAPEZOID, PARALLEL,TILT, TOP HOOK, BOTTOM HOOK.

4.3.1 Input test signal VESA 1024x768 / 85Hz mode & cross-hatch pattern.

4.3.2 Adjust " PINCUSHION " such that PINCUSHION / BARREL distortion of the nominal rectangle specified.

4.3.3 TRAPEZOID / PARALLELOGRAM / TOP & BOTTOM HOOK / TILT Adjustment.



4.3.4 Geometry distortion must limit as above diagram.

4.4 Picture width

4.4.1 Input preset timing adjust,H-SIZE (OSD) to achieve 357 ± 4mm,

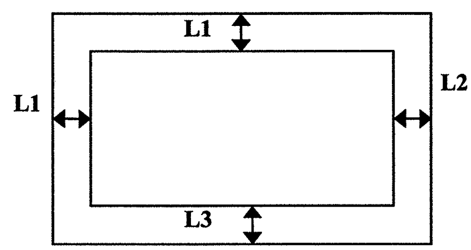
Vertical section adjustments

5.1 Centering(with magnetic filed)

5.1.1 Apply signal at VESA 1024x768 / 75Hz mode, cross-hatch pattern.

5.1.2 Adjust "V-CENTER" to the video display vertically such that the vertical distance from the center of picture to the top bezel edge and the bottom bezel edge is within 3mm.

| L1-L2 | ≦1mm
| L3-L4 | ≦1mm



5.2 Vertical size

5.2.1 Apply preset timing cross-hatch pattern.

5.2.2 Adjust "V-SIZE" such that vertical height is 268mm±1mm.

Dynamic focus adjustment

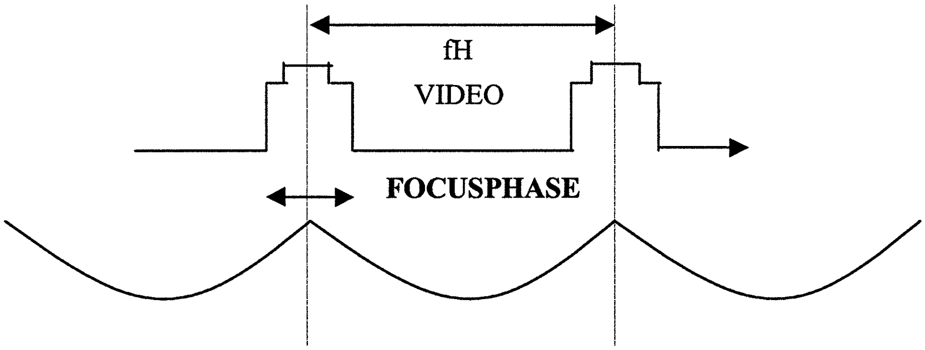
6.1 Dynamic focus phase adjustment

6.1.1 Apply VESA1280x1024 80KHz / 75Hz mode full white pattern.

6.1.2 Connect oscilloscope across T404 pin13 on PCB-MAIN with GND Display size width: 357mm, height 268mm.

6.1.3 The OSD select FACTORY DEFLECTION to "FOCUSPHASE".

6.1.4 Adjust FOCUSPHASE to get horizontal parabolic waveform at center with video signal center by pressing adjust "▲" and "▼".



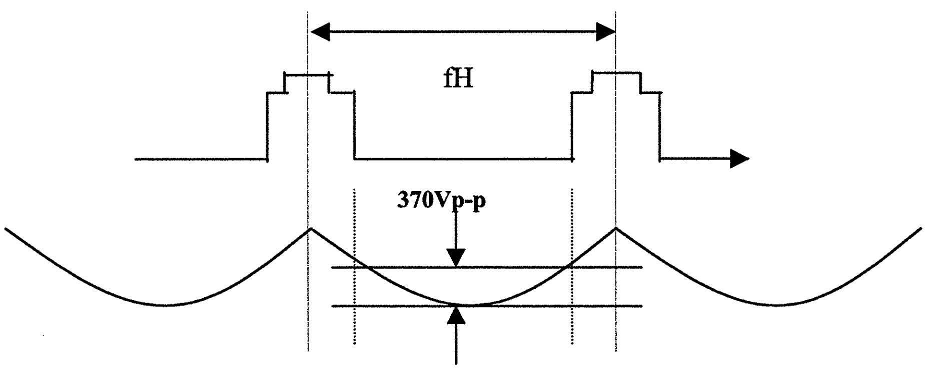
6.2 Dynamic focus parabolic waveform adjustment

6.2.1 Apply 30KHz / 50Hz, 95KHz / 150Hz timing display size width: 357mm, height: 268mm , H-FOCUS = 50% , V-FOCUS = 50%.

6.2.2 Input VGA 480x400 / 70Hz full white pattern.

6.2.3 Select FACTORY PARAMETER to 31KHZ

6.2.4 Adjust horizontal parabolic waveform to get 430 ± 10V_{P-P} (GS790); by pressing adjust "▲" and "▼".



6.2.5 Input 30KHZ/ 50HZ full white pattern, select FACTORY PARAMETER to 50HZ

6.2.6 Adjust vertical parabolic waveform to get 170V_{P-P}±5V_{P-P} by pressing adjust "▲" and "▼".

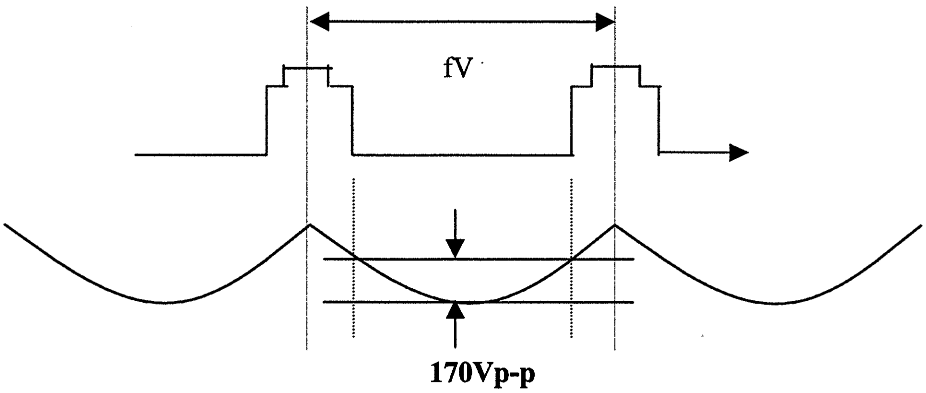
6.2.7 Input VESA1600x1200/75Hz (GS790);VESA1280x1024/75hZ (GS790) full white pattern.

6.2.8 The OSD select FACTORY PARAMETER to 95KHZ

6.2.9 Adjust horizontal parabolic waveform to get 430 ± 10V_{P-P} (GS790) by pressing adjust "▲" and "▼".

6.2.10 Input 95KHz / 150Hz (GS790) full white pattern, the OSD select FACTORY PARAMETER to 150 HZ

6.2.11 Adjust vertical parabolic waveform to get $170V_{P-P} \pm 5V_{P-P}$ by pressing adjust "▲" and "▼".



7. Focus adjustment

7.1 Set BRIGHTNESS at 50% AND CONTRAST at 100%.

7.2 Apply signal (all "ME" pattern)at VESA1024x768 / 75Hz mode.

7.3 Disconnect the RED and BLUE video input so as to produce a green only screen.

7.4 Set FOCUS CONTROL F1, F2 for best focus at midpoint of diagonal line from 10:00 corner to center of screen. F1 control for VERTICAL LINE; F2 control for HORIZONTAL LINE; individual; pixels should be distinguishable over entire display area.

8. Video preset condition

8.1 Apply VESA 1024x768 / 75HZ

8.2 Display size width: 357 ± 4mm, height: 268 ± 4mm

8.3 CONTRAST "100"

8.4 BRIGHTNESS "100"

8.5 RCUT, GCUT , BCUT "60"

8.6 RGAIN, GGAIN, BGAIN "200"

8.7 G1 "200" (GS790)

9. Video alignment

9.1 Video cut off adjustment

9.1.1 Adjust VR601 to get the raster 0.3~0.7 FLS (center=0.4 FLS).

9.1.2 Adjust "RCUT", "GCUT", "BCUT" to get color coordination.
x=0.283±0.010 , y=0.297±0.010

9.1.3 Adjust "VR601" to get the raster Y=0.7±0.3 FLS

9.1.4 Ensure that color coordination is x=0.283±0.010, y=0.297±0.010, if color coordination out specification, repeatedly item 9.1.1~9.1.3, until it meet specification.

9.1.5 Adjust R.G.B BIAS control to meet following chromatically spec.

9300°K→ x = 0.283±0.010 , y = 0.297±0.010 , Y = 0.7±0.3 FL
6500°K→ x = 0.311±0.010 , y = 0.329±0.010
5000°K→ x = 0.346±0.010 , y = 0.359±0.010

9.2 Brightness and white balance adjustment

9.2.1 Set VESA 1024x768 / 75Hz window pattern, CONTRAST = 100% BRIGHTNESS = 50%.

9.2.2 Apply green white window pattern adjust G-DRIVER to obtain GREEN window pattern light output about Y = 30±2 FLS

9.2.3 Apply white window pattern, adjust R-DRIVER, B-DRIVER to meet following chromatically spec. after G-DRIVER fixed.

9300°K → x = 0.283±0.010 , y = 0.297±0.010

9.2.4 Get Y = 40±3 FLS

9.2.5 Apply GREEN white window pattern light output about (Y = 26±2 FLS).

9.2.6 Apply white window pattern, adjust R-DRIVER, B-DRIVER following chromatically spec. after G-DRIVER fixed.

6500°K→ x = 0.313±0.010 , y = 0.329±0.010

9.2.7 Apply GREEN white window pattern, adjust G-DRIVER to obtain GREEN window pattern light O/P about (Y = 24±2 FLS.

9.2.8 Apply WHITE window pattern ,adjust R-DRIVER, B-DRIVER to meet following chromatically spec. after G-DRIVER fixed.
5000°K→ x = 0.346±0.010 , y = 0.359±0.010

9.3 Apply full WHITE pattern, adjust VR403 to get Y = 30±2 FLS and check the chromatically meet following spec.

9300°K only for 1024x768 / 75Hz
| x (Y=MAX) – x (Y = 10) | <= 0.010
| y (Y=MAX) – y (Y = 10) | <= 0.010

10. X-RAY adjustment/FACTORY MODE disable

10.1 X-RAY adjustment & check

10.1.1 Input 640X480 / 31.5Kz mode, cross-hatch pattern.

10.1.2 Set CONTRAST 100%, BRIGHTNESS 50%.

10.1.3 Use 47K 1% parallel with R4123 15K (P402).

10.1.4 Adjust VR401 let picture shut down.

10.1.5 Use 68K 1%(GS790) ; 60K 1%(E90/Q95) parallel with R4123 15K 1% (P402) , the picture must be OK.

10.2 Factory mode enable/disable

10.2.1 Press "ENTER" key until push power knob on/off four times that can enable factory mode. If press "▲" key until push power knob one time that can disable factory mode.

10.2.2 Press "▼"key until push power knob four times, that can enable burning mode and can use fixture to adjust picture. If press r "MENU" key until push power knob one time, that can disable burning mode.

D. Fixture Function Description

1. Fixture adjust.

Adjust Program

H . Position	255	Rotation	255	B Drive	255	
H. Size	255	HDBF_31KH	255	R Cut-Off	255	
V . Position	255	HDBF_95KH	255	G Cut-Off	255	
V . Size	255	VDBF_50Hz	255	B Cut-Off	255	
Sidepin	255	VDBF_150Hz	255			
PinBalance	255	Rotation	255			
Keystone	255	Rotation	255	Get Data		
Parallel	255	Rotation	255	Get 9300		
TopCorner	255	Rotation	255	Get 6500		
BomCorner	255	Rotation	255	Get 5000		
TopBalance	255	Rotation	255	Save Geometry		
BomBalance	255			Save Parameter		
H_Moire	255	G1V_Fine	255	Save Color		
V_Moire	255	Contrast	255			
H_Focus	255	Brightness	255			
Raster	255	R Drive	255			
Hliner	255	G Drive	255			
FocusPhase	255		255			

2. Command define.

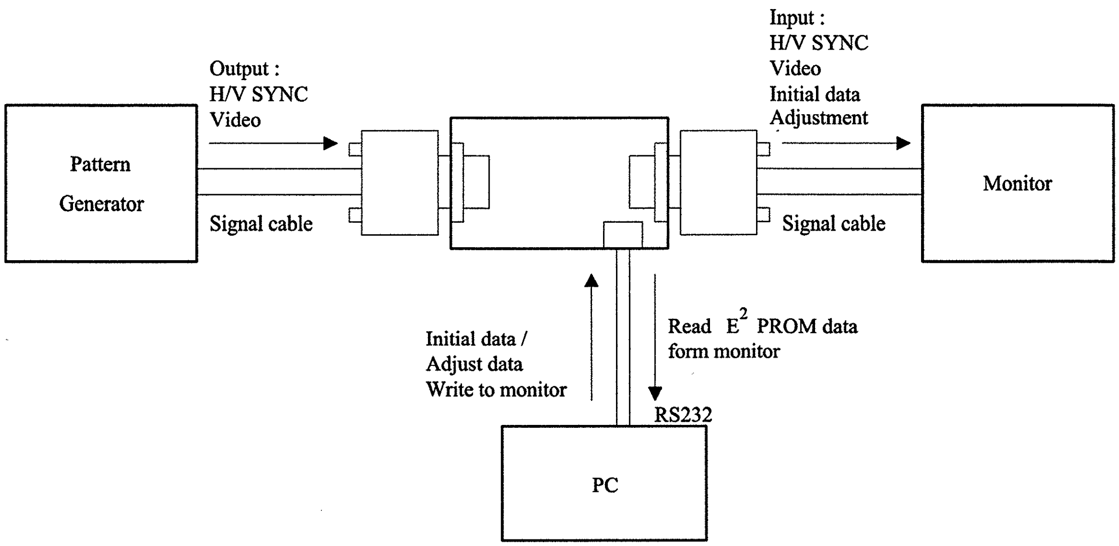
2.1 Loading initial data file : File -> Open -> select file -> open

2.2 Write initial data to monitor : Monitor -> write_eep .

2.3 Get data : Read E^2PROM data (one mode adjustment value).

2.4	Get 9300	: get color 9300K to adjust .
2.5	Get 6500	: get color 6500K to adjust ..
2.6	Get 5000	: get color 5000K to adjust .
2.7	Save color	: save current color temperature data .
2.6	Save geometry	: Save geometry adjustment data.
2.7	Save parameter	: Save adjustment data to E^2PROM.

4. Fixture Connect.



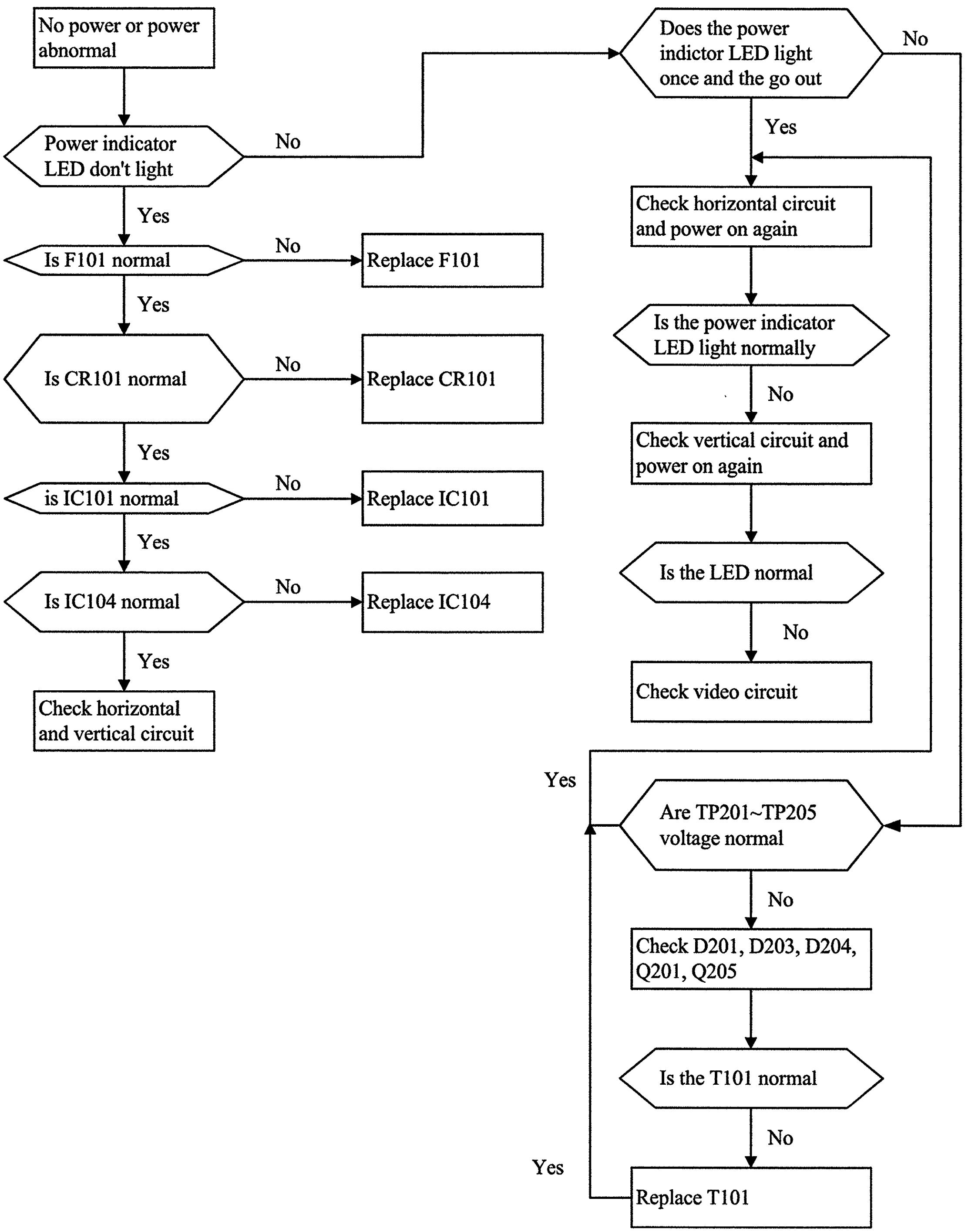
6.

Trouble shooting flow chart

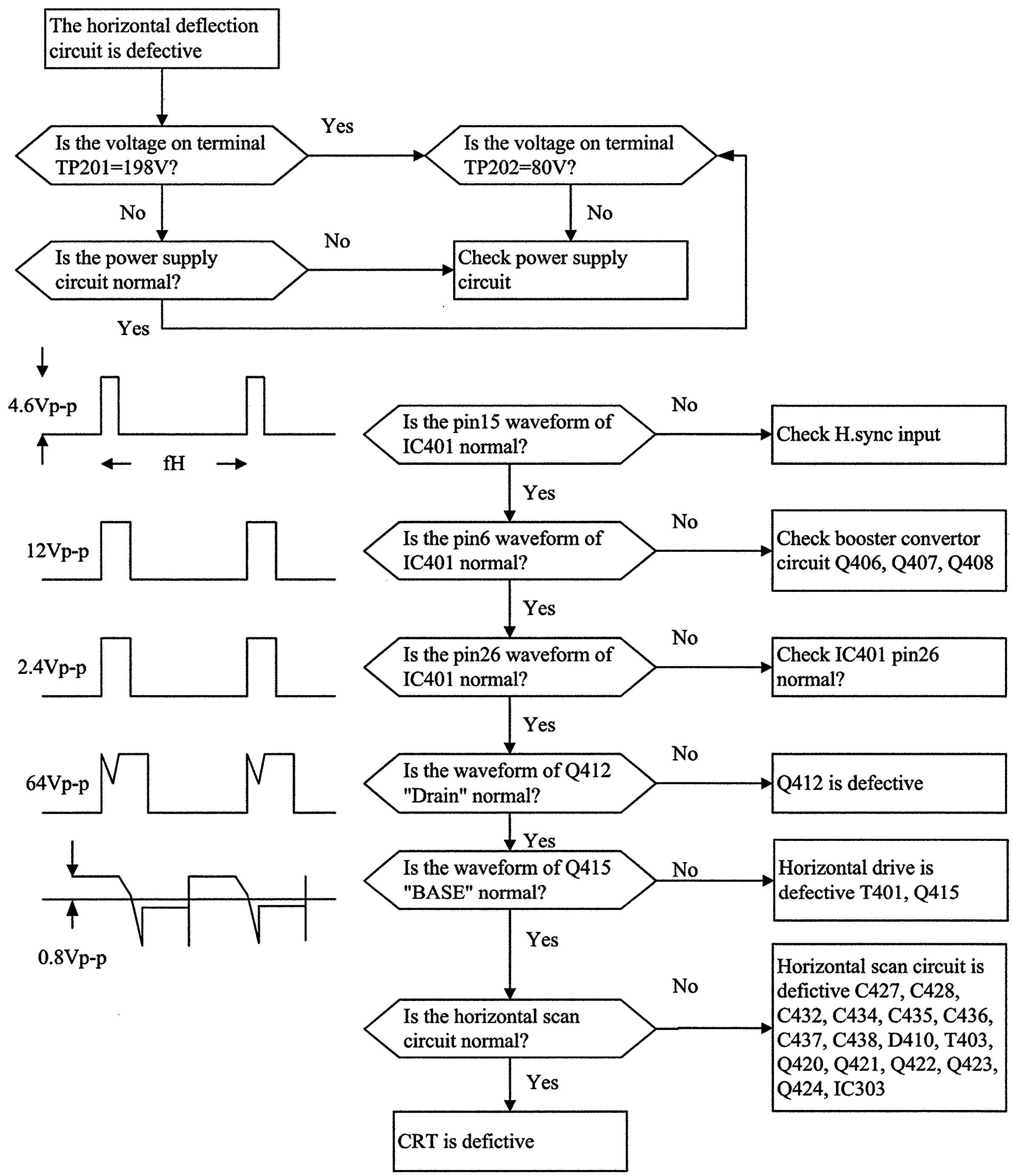
1. Power supply is defective .
2. Horizontal deflection circuit is defective .
3. The raster don't appear .
4. Vertical deflection is defective .
5. Video is defective .

trouble shooting flow chart

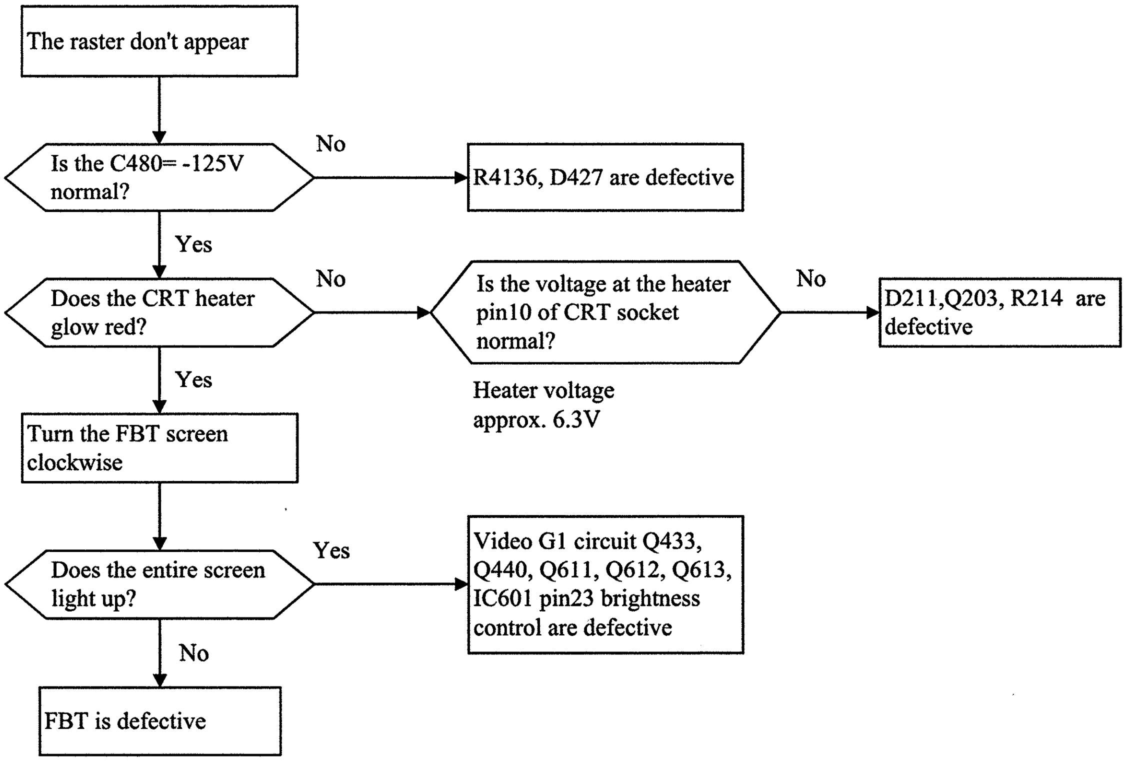
1. Power supply is defective .



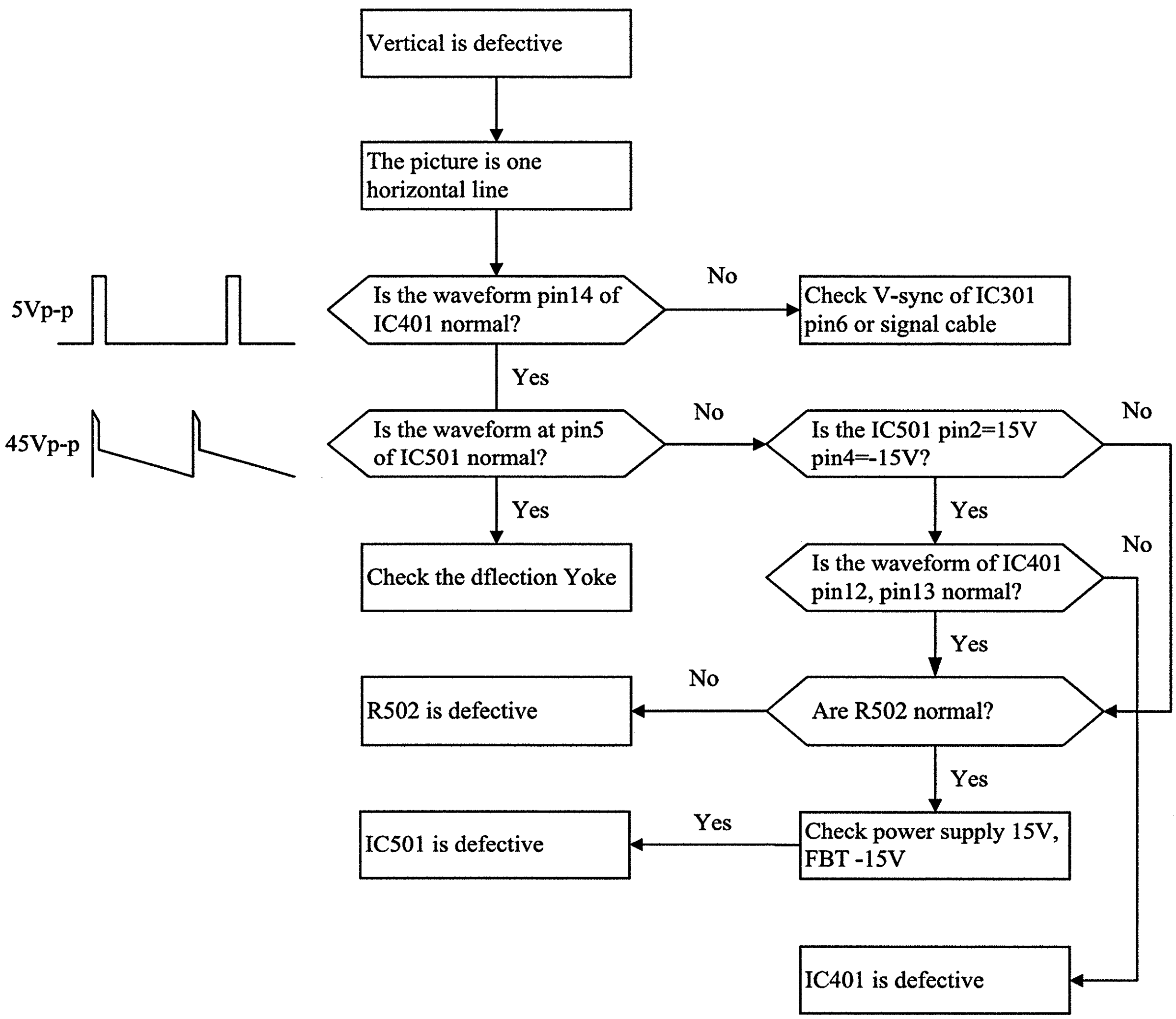
2. Horizontal deflection circuit is defective .



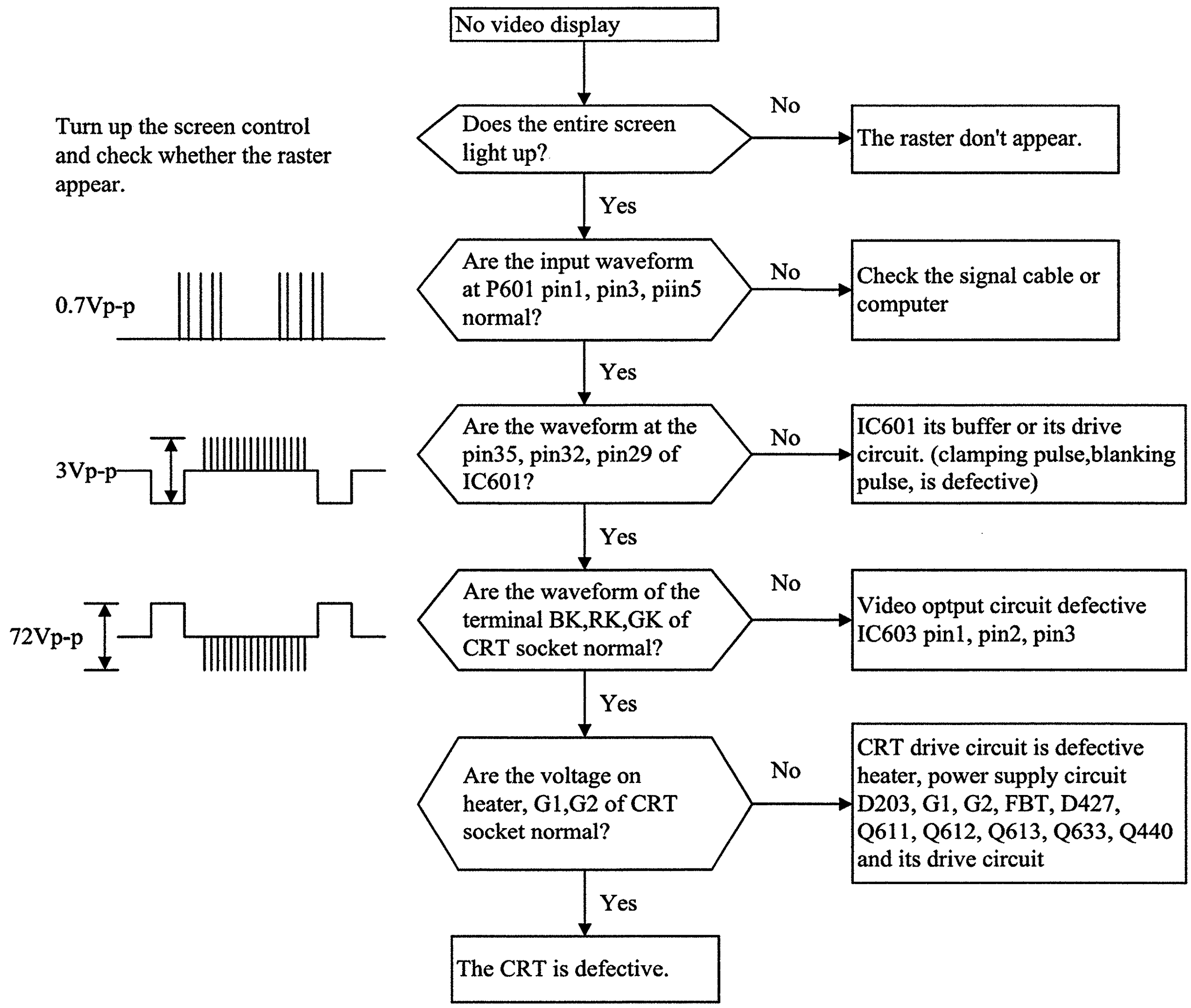
3. The raster don't appear .



4. Vertical deflection is defective .

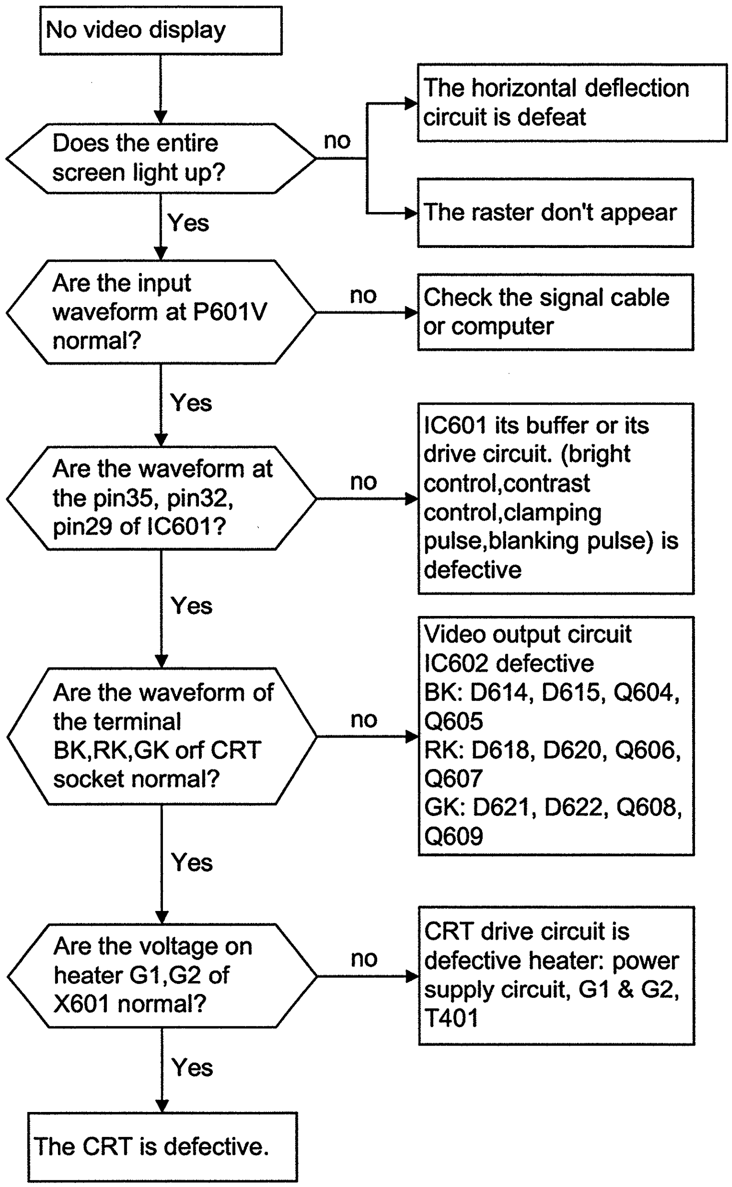


5. Video is defective .

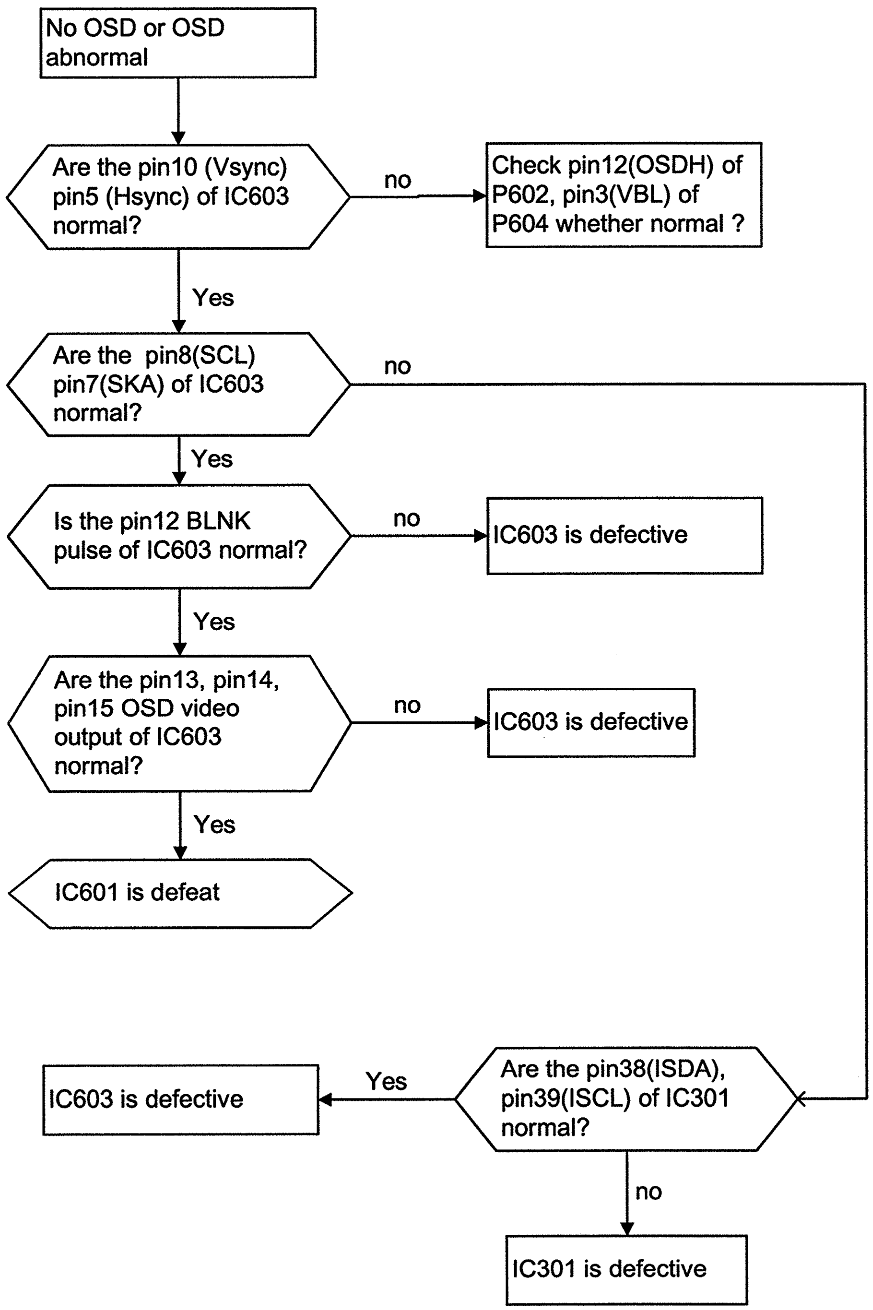


6. One Color missing

turn up the screen control and check whether the raster appear.



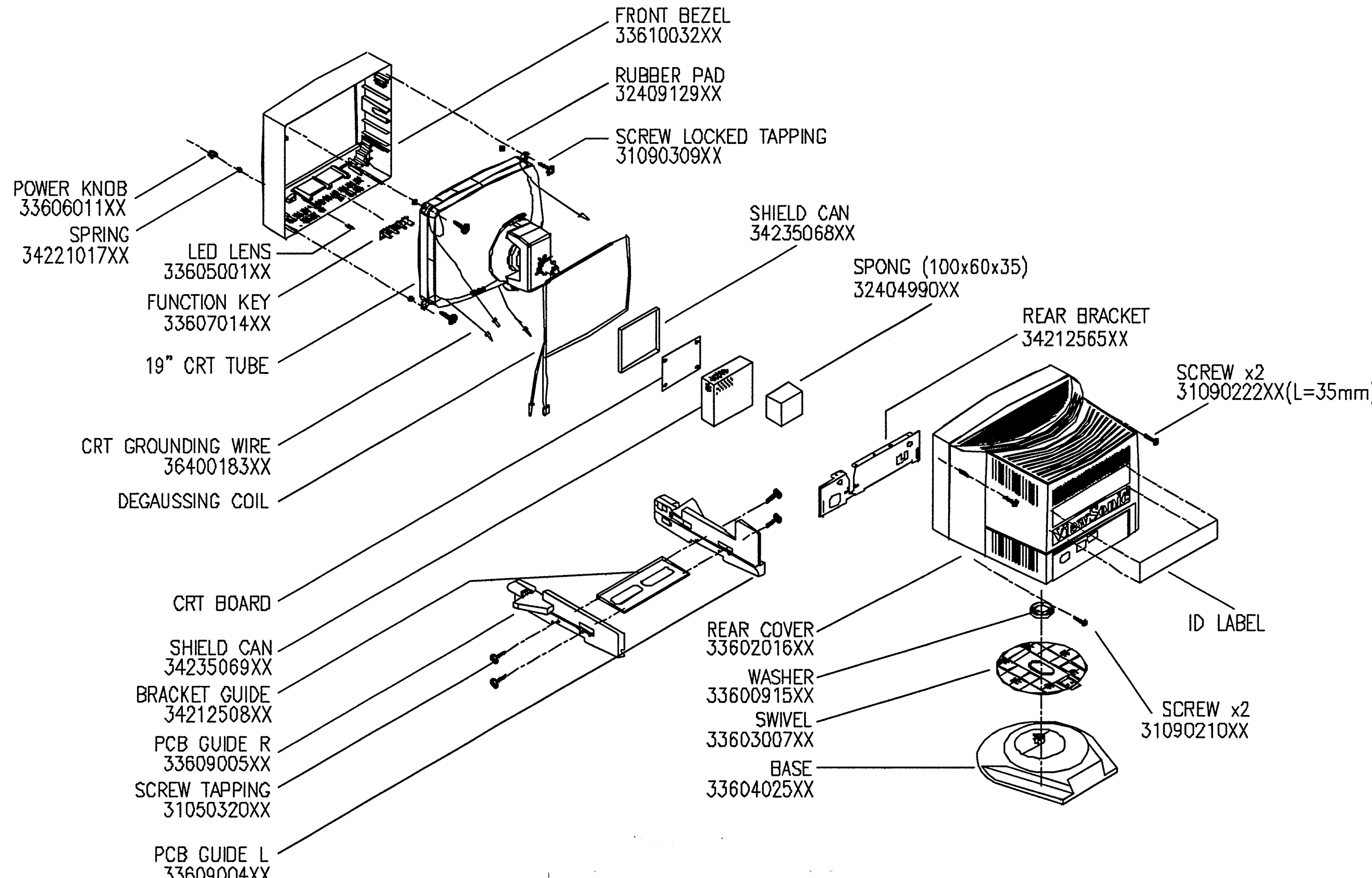
7. OSD is Defective



7.

Mechanical assembly

MONITOR GS790 ENGINEERING NOTICES



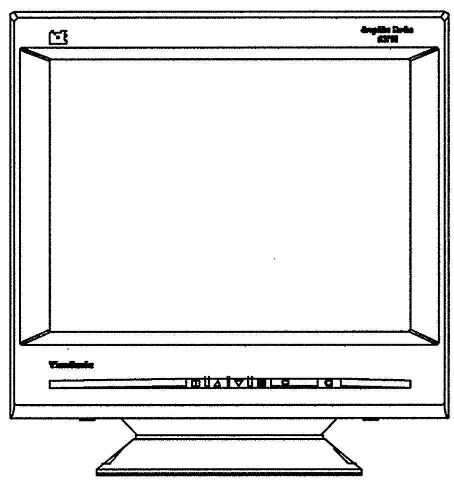
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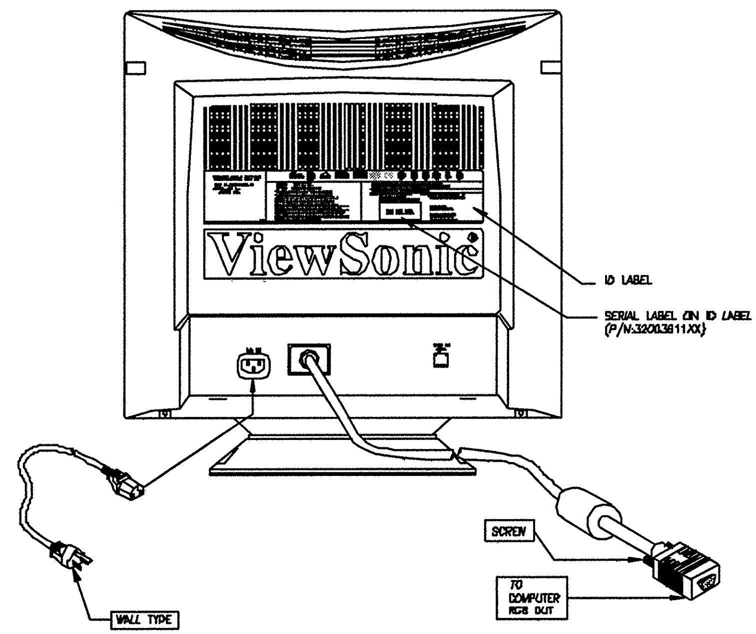
MODEL NAME: GS790	
PAGE: 1 OF X-0	

Mechanical Parts List

ITEM	PART DESCRIPTION	GS790 PART NO.
1	FRONT BEZEL	3361003200
2	POWER KNOB	3360601101
3	POWER SPRING	3422101700
4	RUBBER FOOT	
5	LED LENS	3360500100
6	SCREW LOCKED TAPPING	3109030900
7	PCB GUIDE - R	3360900500
8	PCB GUIDE - L	3360900400
9	CRT GROUNDING WIRE	3640018302
10	DEGAUSSING COIL	2840003007
11	SHIELD CAN	3423506800
12	REAR BRACKET	3421266501
13	FUNCTION KEY	3360701400
14	GUIDE BRACKET	3421250801
15	RUBBER PAD	3240920800
16	SPONGE	3240499000
17	COVER BRACKET	
18	REAR COVER	3360201600
19	WASHER	3360091500
20	SWIVEL	3360300700
21	BASE	3360402500
22	SCREW MACHINE	
23	PLASTIC COVER - R	
24	PLASTIC COVER - L	

MONITOR GS790 ENGINEERING NOTICES





NOTE : UNLESS OTHERWISE SPECIFIED

1.ENSURE THE REAR COVER IS FULLY INSERTED .
AND THEN FASTEN 4PCS SCREWS (P/N:31090222XX USED UPON OF F/B & R/C , P/N : 31090210XX USED ON DOWN OF F/B & R/C) .

2.REMEMBER TO ADHERE ID LABEL ON THE BACK SIDE OF REAR COVER .

3.MAKE SURE THE MOTION BETWEEN TILT AND SWIVEL IS SMOOTH , WITHOUT SQUEAKS AND GAPS , APPLY LUBRICANT ONTO FRICTION SURFACE OF SWIVEL DEVICES IS ACCEPTABLE .

4.PACKING MATERIAL HAVE TO MEET ENG , DEPT , SPEC .

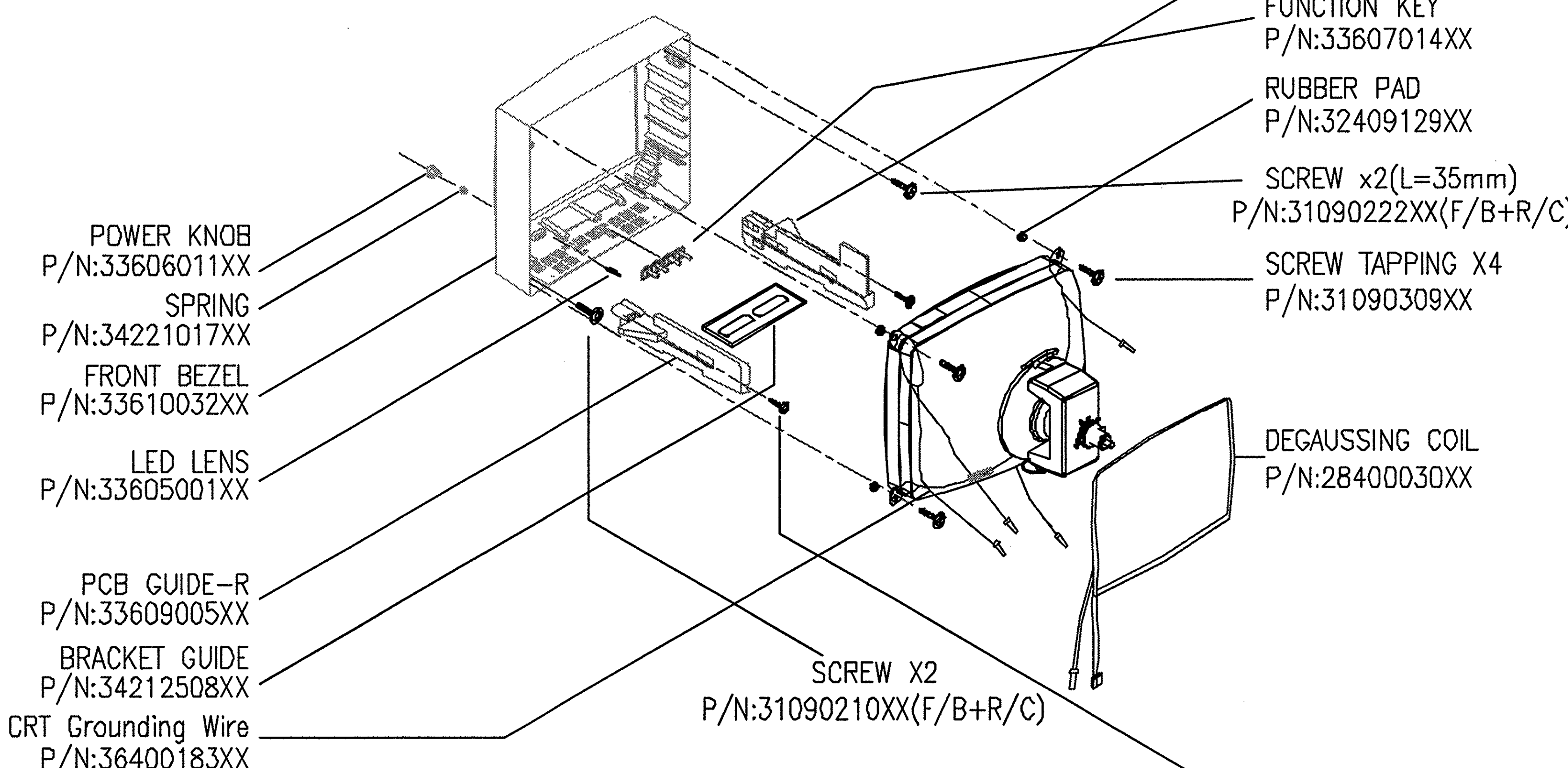
5.INSPECTION REFER TO SPCE. 10000-0151.

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MODEL NAME :	GS790
PAGE :	4 OF X-0

MONITOR GS790 ENGINEERING NOTICES

FRONT BEZEL ASS'Y



NOTE:UNLESS OTHERWISE SPECIFIED之組裝

A. FRONT BEZEL + (POWER KNOB +SPRING) +FUNCTION KEY + LED LENS = FRONT BEZEL ASS'Y

1.POWER KNOB 先放入彈簧 再裝入 FRONT BEZEL時, 注意其方向不可裝反.
2.FUNCTION KEY卡入前框後, 並點膠固定之.
3.LED LENS 裝入前框 BOSS 定位後, 需用鉻鐵熱壓緊予以固定.
4.USE 2 PCS BUMBER FOOT TO FIX FRONT BEZEL BOTTOM, AND PRESS ON WITH BUMBER FOOT.

B.FRONT BEZEL ASS'Y + CRT ASS'Y之組裝

1.CRT 放置 F/B 前需先墊 4PCS RUBBER PADS (P/N:32409129XX)
2.DEGAUSSING COIL CABLE TIE固定CRT 4PCS 角落暫不拉緊, 等CRT與FRONT BEZEL鎖上後再拉緊.
3.使用4PCS SCREW WITH LOCK WASHER先放入CRT對準 CRT MOUNTING PURSE LOCK BOSS孔徑鎖緊, 鎖時注意電動起子扭力設力設定值 (20~25)上鎖時依對角順序作業原則.

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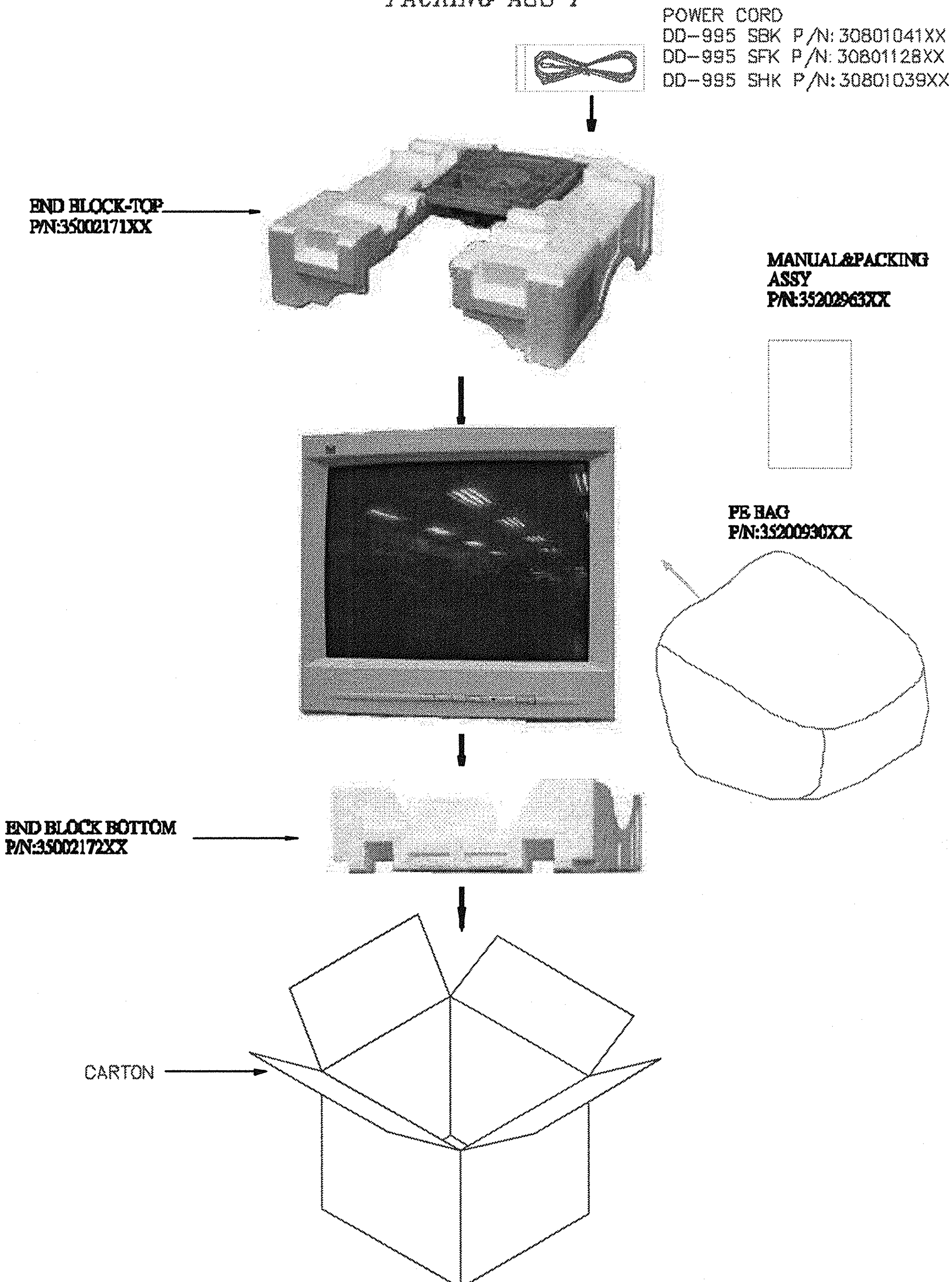
MODEL NAME:	GS790
PAGE:	7 OF X-0

GS790 SCREW TORQUE LIST

ASSEMBLY PARTS	SCREW		TORQUE Kgf.CM	REMARK
	DESCRIPTION	PART NO.		
FRONT BEZEL + REAR COVER	TAPPING SCREW 4x20X16 mm	31090210XX	10~ 18	
FRONT BEZEL + REAR COVER	TAPPING SCREW 4x20x35 mm	31090222XX	10 ~ 18	
CRT + FRONT BEZEL	TAPPING SCREW 5x16x25 mm	31090309XX	20 ~ 25	
HS501 + HS401	SCREW MACHINE M3x0.5X10 mm	31003010XX	5 ~ 10	
FRONT BEZEL + PCB GUIDE	SCREW TAPPING 4x20x16 mm	31090210XX	10 ~ 15	
GUIDE BRACKET + PCB GUIDE	SCREW MACHINE M3x0.5x12 mm	31050320XX	5~ 10	
CRT GROUNDING WIRE + HS501	SCREW MACHINE M3x0.5x10 mm	31003010XX	5 ~ 10	
WIRE WITH TERMINAL + HS401	SCREW MACHINE M3x0.5x10 mm	31003010XX	5 ~ 10	
HSET SINK + (IC501,Q904,D410,Q905,CR101,Q415,IC101,Q417,Q418, Q423,Q424,Q420,Q408,Q416,IC201,Q422,Q421,Q412,Q437)			3 ~ 5	
METAL BRACKET + PCB	TAPPING SCREW 3x0.5x8 mm	31090101XX	10 ~ 15	
METAL BRACKET + PCB + AC SOCKET	TAPPING SCREW 3x0.5x10 mm	31090103XX	10 ~15	
METAL BRACKET + SIGNAL CABLE + FG CABLE	TAPPING SCREW ø4x8 mm	31090204XX	10 ~15	

MONITOR GS790 ENGINEERING NOTICES

PACKING ASS'Y



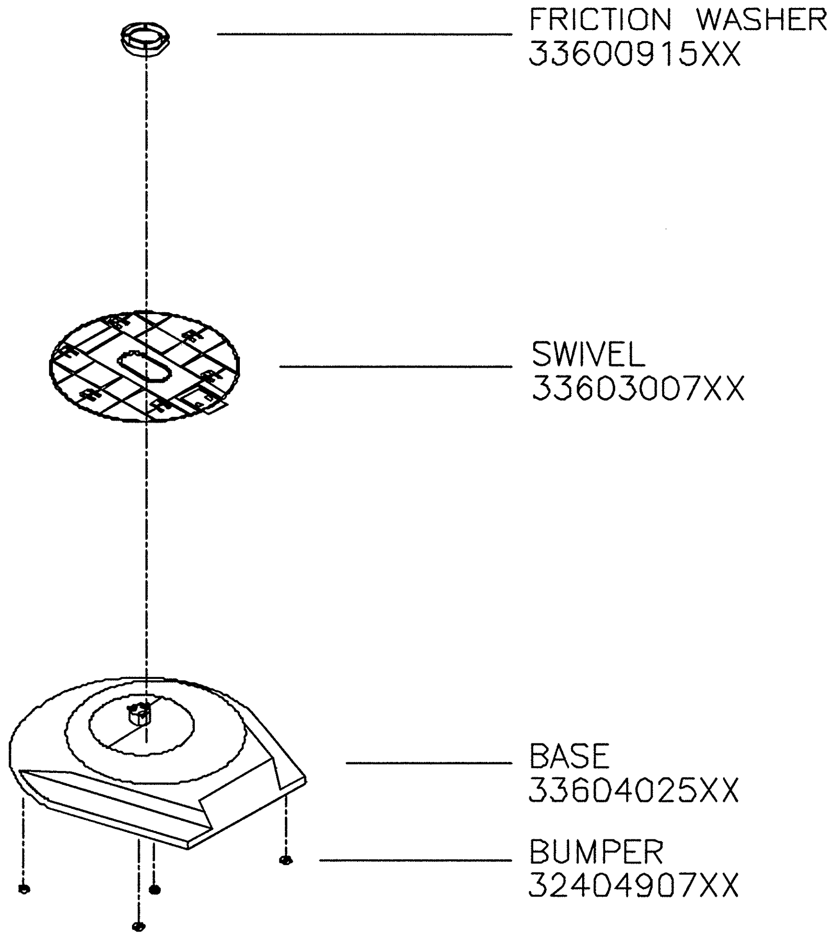
NOTES: UNLESS OTHERWISE SPECIFIED

1. 將 END BLOCK BOTTOM (P/N:35002172XX)放置在 CARTON 內.
2. 將 MONITOR 套入PE BAG 內後,放入END BLOCK BOTTOM 內.
3. 將 MANUAL & PACKING ASSY 放置 MONITOR 後殼上方,然後蓋上 END BLOCK-TOP(35002171XX).
4. 將 POWER CORD 置入 MOINTOR 後方與 CARTON 之間.
5. 將 CARTON 上蓋用TAPE封住.

MODEL NAME: GS790	
PAGE: 13	OF X-0

MONITOR GS790 ENGINEERING MOTICES

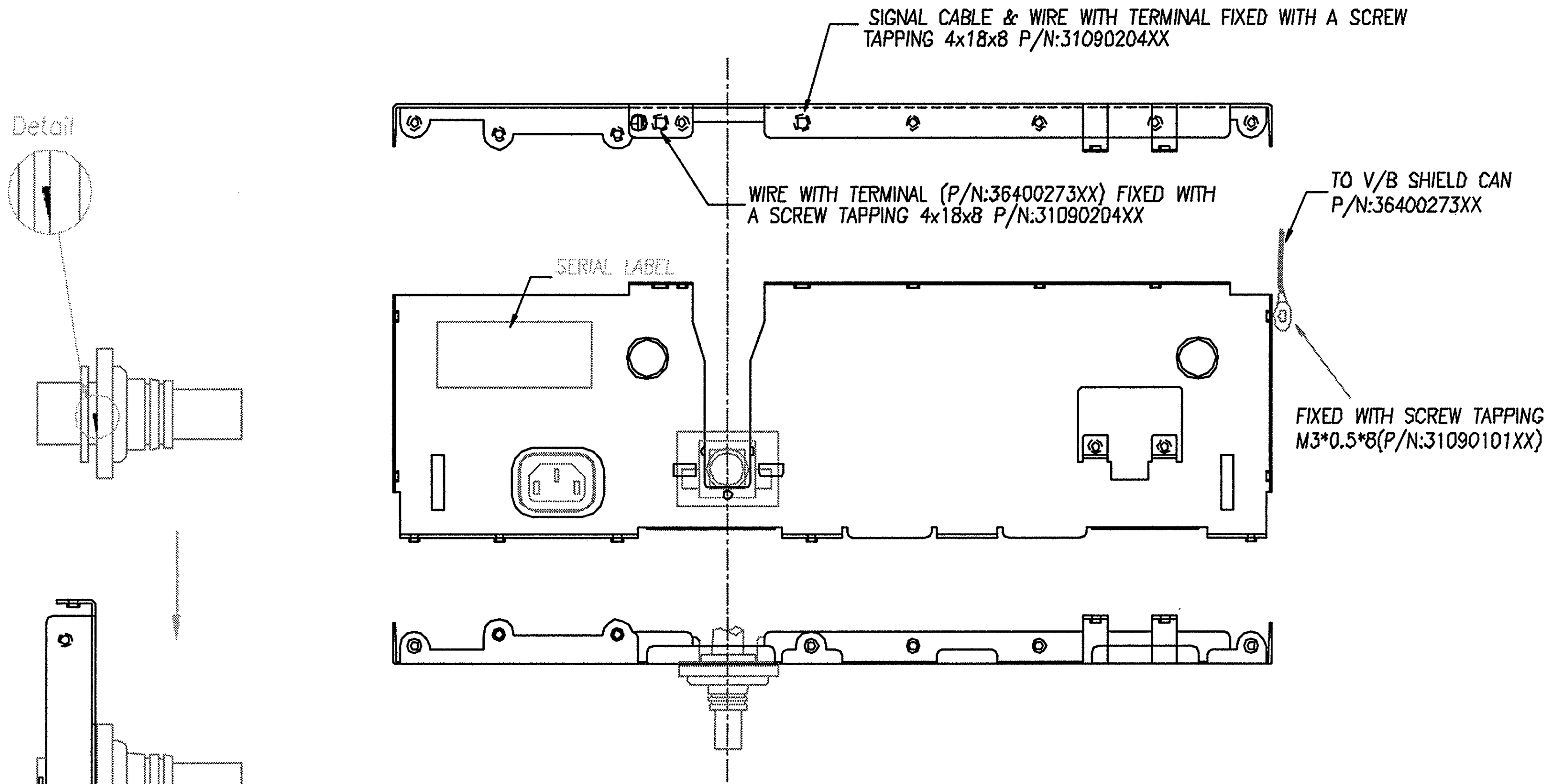
SWIVEL BASE ASS'Y



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MODEL NAME :	GS790
PAGE :	16 OF X-0

MONITOR GS790 ENGINEERING NOTICES



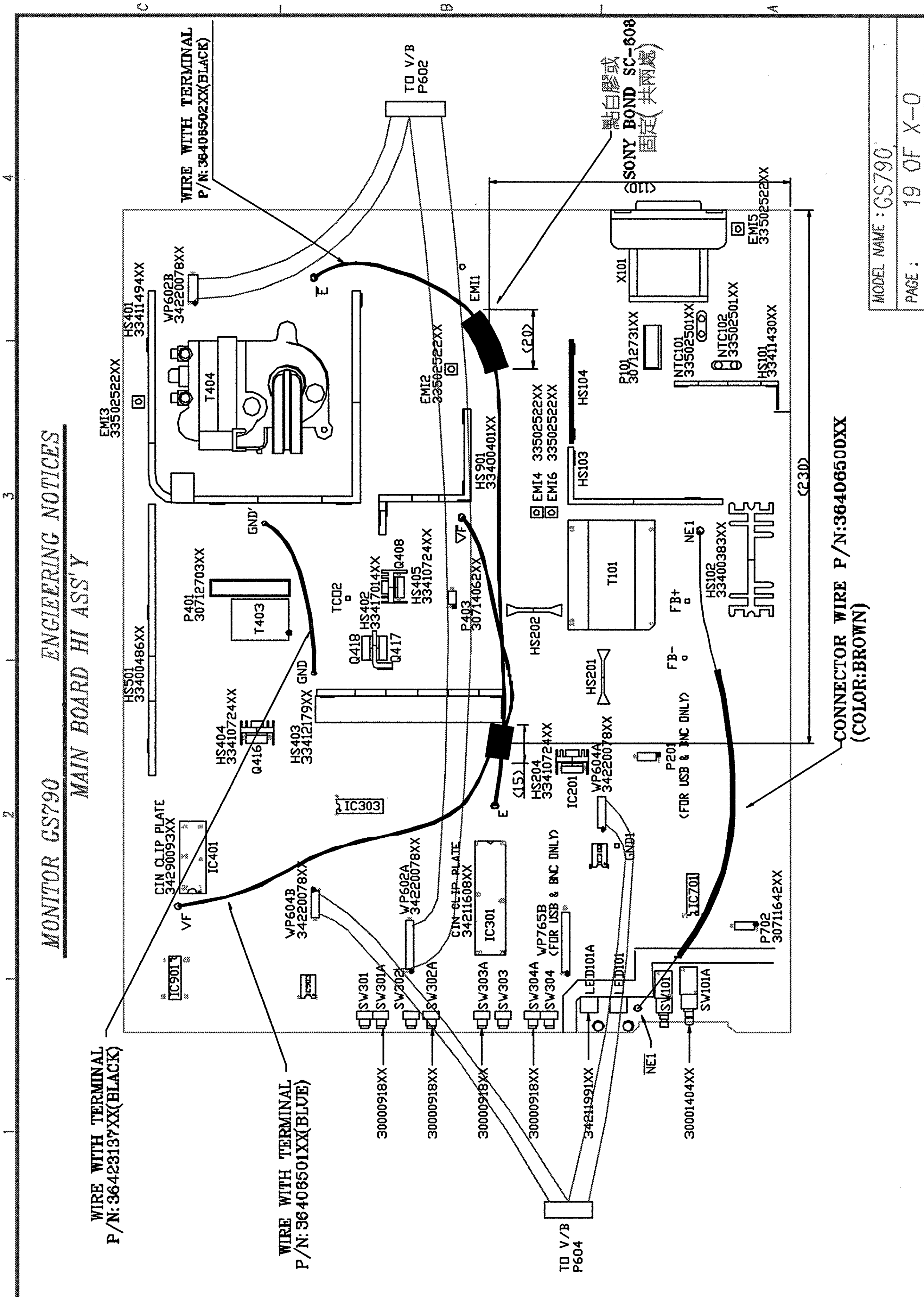
NOTE : UNLESS OTHERWISE SPECIFIED

1.SIGNAL CABLE 安置於 REAR BRACKET 時其 S/R 之倒勾須向上並卡在 REAR BRACKET 之兩個圓孔內

2.SIGNAL CABLE (P/N:30803029XX L=1.8m IVORY) AND WIRE WITH TERMINAL (P/N:36400273XX) USE SCREW TAPPING P/N:31090204XX TO FIX ON HOLE OF REAR BRACKET (AS UP PICTURE)

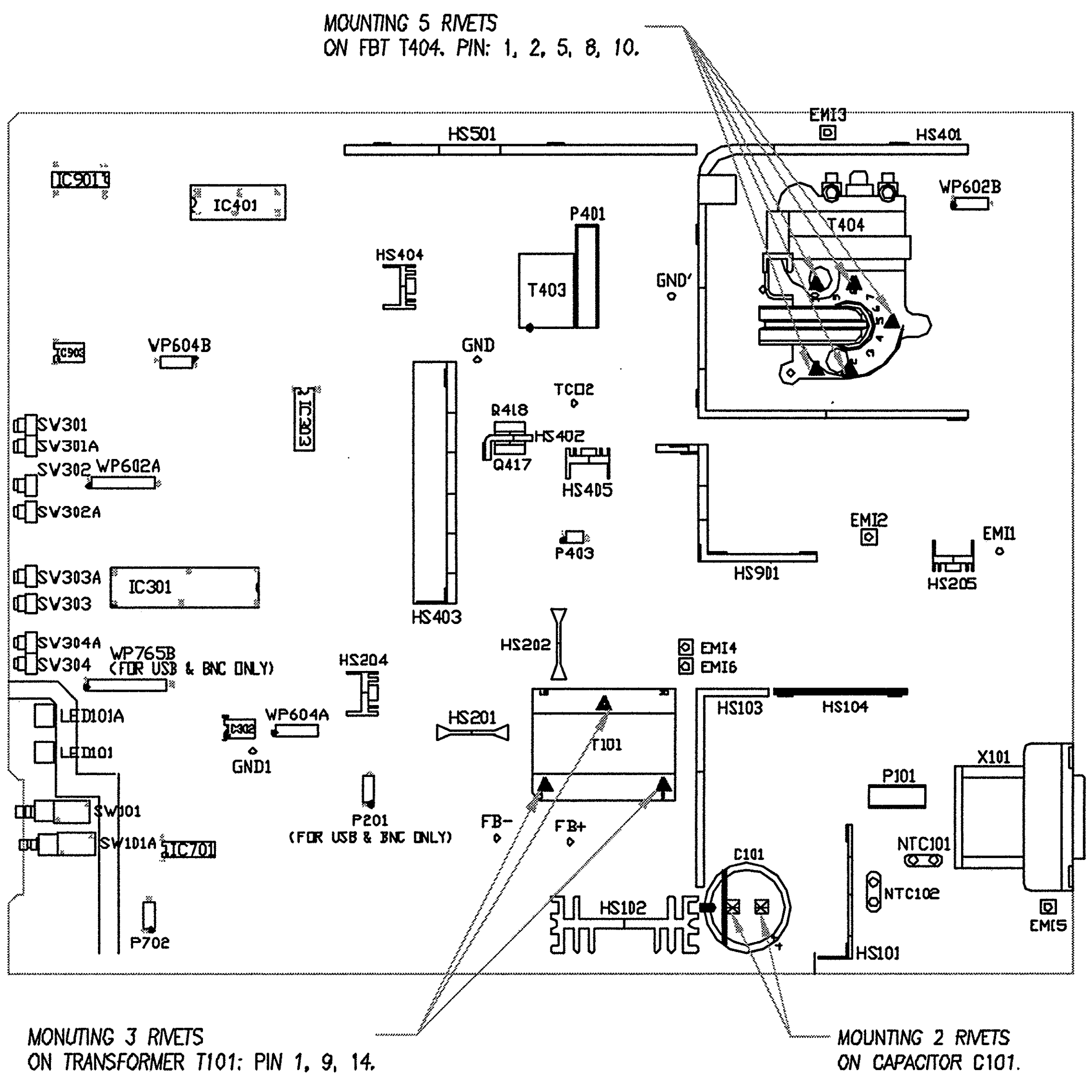
3.MAIN BOARD SERIAL LABEL (P/N:32001284XX)

MODEL NAME :	GS790
PAGE :	18 OF X-0



MONITOR GS790 ENGINEERING NOTICES
MAIN BOARD HI ASS'Y
WIRE WITH TERMINAL P/N:36406502XX(BLACK)
TO V/B P602
WP602B 34220078XX
HS401 33411494XX
EMI3 33502522XX
T404
EMI2 33502522XX
EMI1
(20)
(110)
黏白膠或 SONY BOND SC-608 固定(共兩處)
X101
EMI5 33502522XX
P101 30712731XX
NTC101 33502501XX
NTC102 33502501XX
HS101 33411430XX
HS104
EMI4 33502522XX
EMI6 33502522XX
HS103
HS901 33400401XX
(230)
GND'
P401 30712703XX
T403
TC02
HS402 33417014XX
Q408
HS405 33410724XX
VF
P403 30714062XX
T101
NE1
FB+
HS102 33400383XX
HS202
FB-
HS201
CONNECTOR WIRE P/N:36406500XX (COLOR:BROWN)
Q418
Q417
GND
HS501 33400486XX
HS404 33410724XX
Q416
HS403 33412179XX
(15)
HS204 33410724XX
IC201
WP604A 34220078XX
P201 (FOR USB & BNC ONLY)
E
IC303
CIN CLIP PLATE 34290093XX
IC401
VF
GND1
WP604B 34220078XX
WP602A 34220078XX
CIN CLIP PLATE 34211608XX
IC301
WP765B (FOR USB & BNC ONLY)
IC701
P702 30711642XX
IC901
SW301 SW301A SW302 SW302A SW303A SW303 SW304A SW304
LED101A LED101
SW101 SW101A
NE1
30000918XX
30000918XX
30000918XX
30000918XX
34211991XX
30001404XX
WIRE WITH TERMINAL P/N:36423137XX(BLACK)
WIRE WITH TERMINAL P/N:36406501XX(BLUE)
TO V/B P604
MODEL NAME : GS790
PAGE : 19 OF X-0

MONITOR GS790 ENGIEERING NOTICES



NOTE : UNLESS OTHERWISE SPECIFIED

1.MAIN BOARD 零件需打鉚釘之位置如下:

(a) :TRANSFORMER T101 之 PIN 1,9,14 共三顆
(P/N:33501411XX)

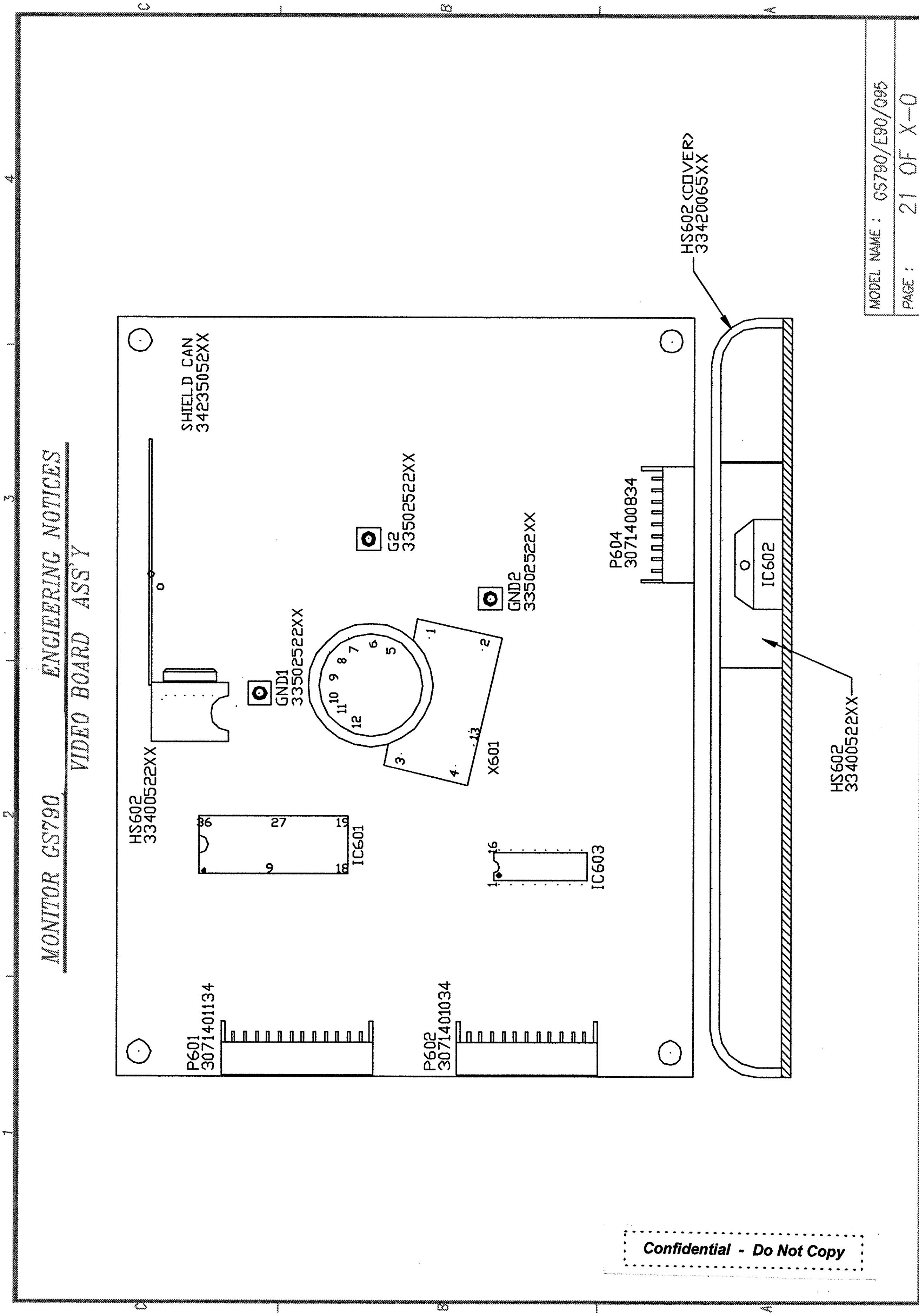
(b) :FBT T404 之 PIN 1,2,5,8,10 共五顆
(P/N:33501419XX)

(c) :CAPACITOR C101 2PINS 共兩顆
(P/N:33501411XX)

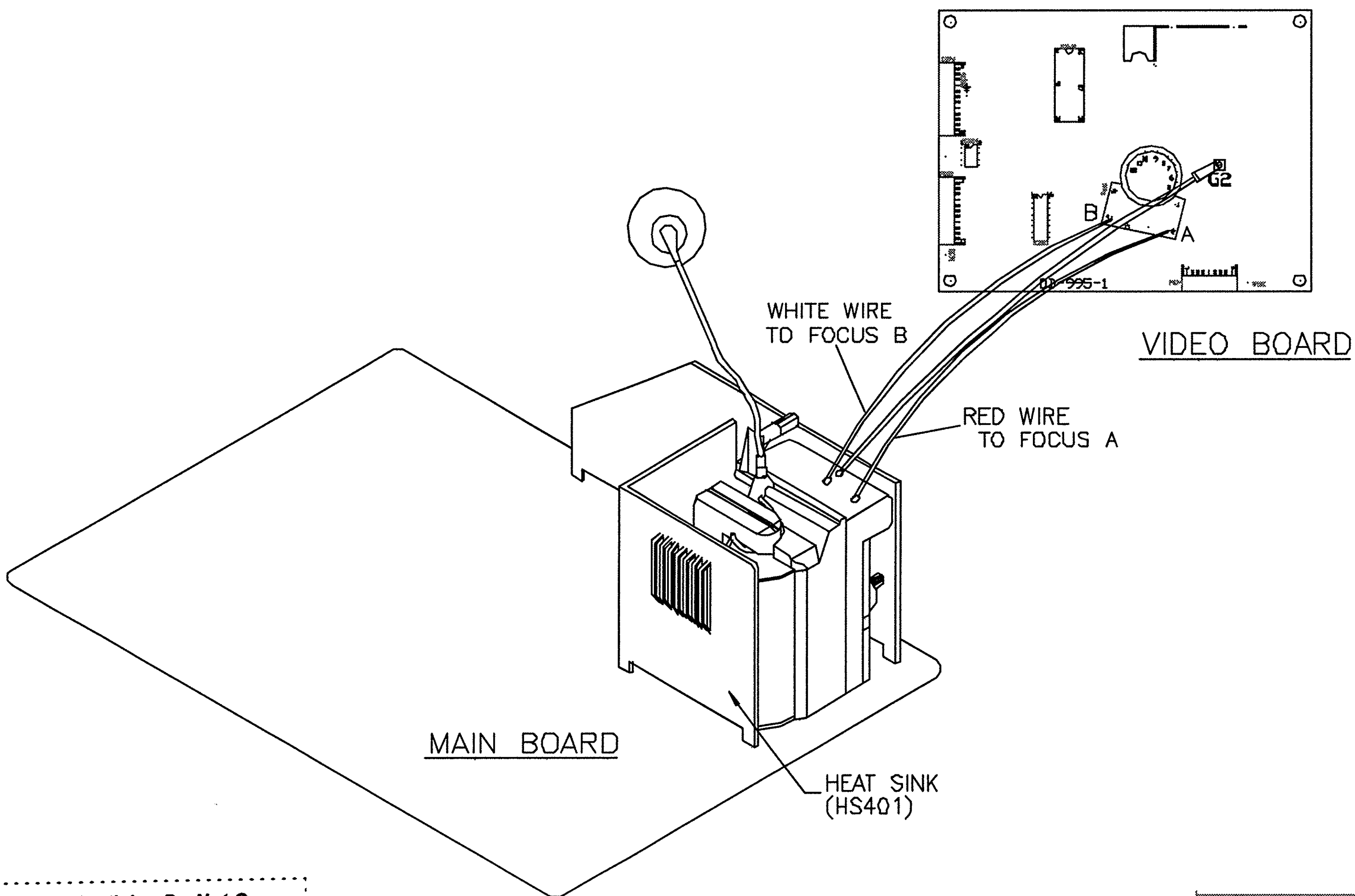
2.AC SOCKET 安置在 MAIN BOARD X101. 其定位孔需與 MAIN BOARD 之定位孔對齊, 以利後續動作, 不影響 2顆 SCREW (M3x0.5x10 P/N:31090103XX) 之上鎖

3.REAR BRACKET 安裝在 MAIN BOARD 之後方, 其孔位須對正 MAIN BD 之孔加鎖螺絲, 其中 2顆 (3x0.5x10 P/N:31090103XX) 會一併將 AC SOCKET & MAIN BD 鎖上; 另二顆 (3x0.5x8 P/N:31090101XX) 直接由 MAIN BD 鎖至 REAR BRACKET.

MODEL NAME :	GS790
PAGE :	20 OF X-0


MONITOR GS790 ENGIEERING NOTICES
VIDEO BOARD ASS'Y
MODEL NAME : GS790/E90/G95
PAGE : 21 OF X-0
SHIELD CAN
34235052XX
HS602
33400522XX
HS602 <COVER>
33420065XX
G2
33502522XX
GND1
33502522XX
GND2
33502522XX
P601
3071401134
P602
3071401034
P604
3071400834
IC601
IC602
IC603
X601
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MONITOR GS790 ENGINEERING NOTICES



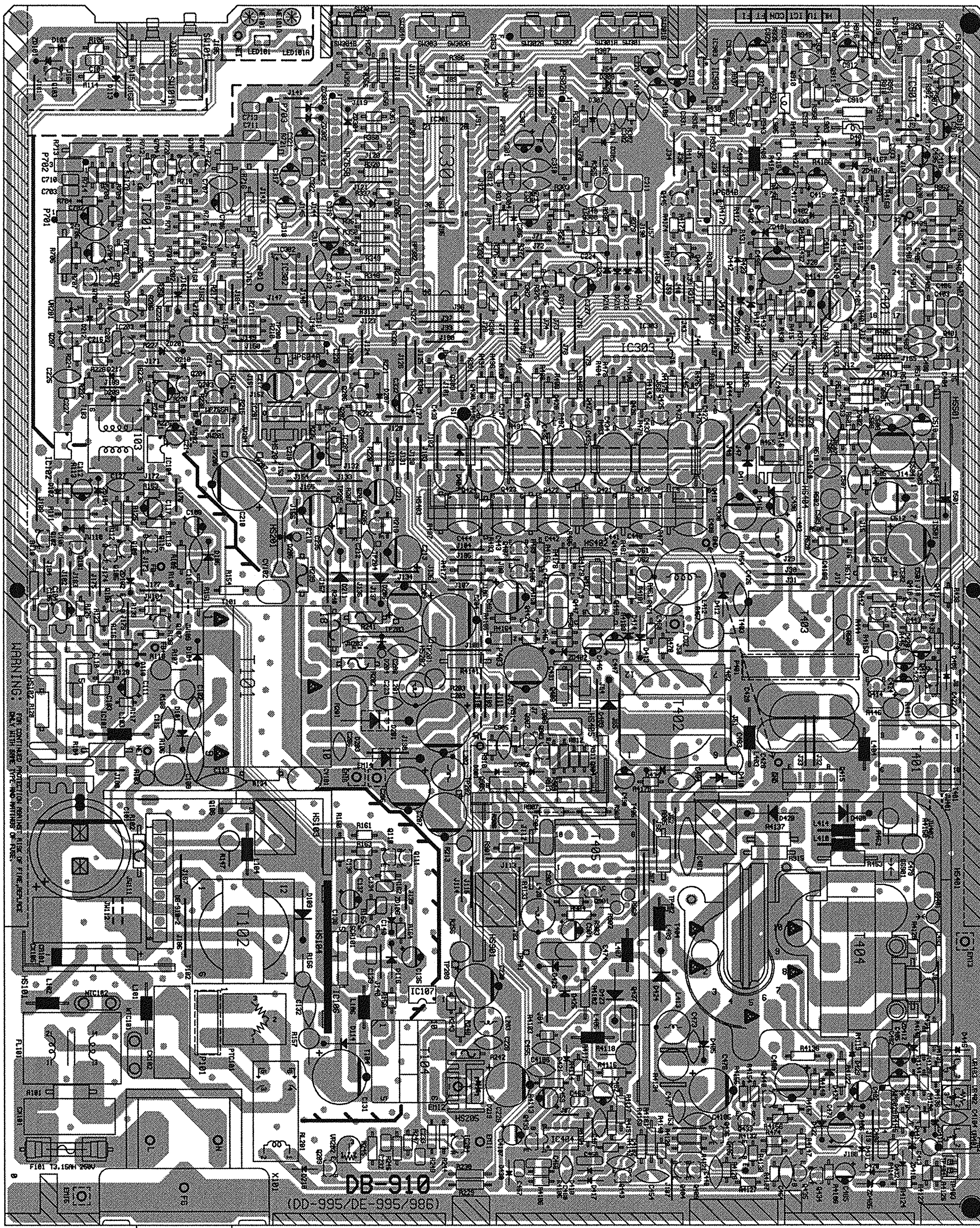
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MODEL NAME :	GS790/E90/Q95
PAGE :	22 OF X-0

8.

PCB layout diagram

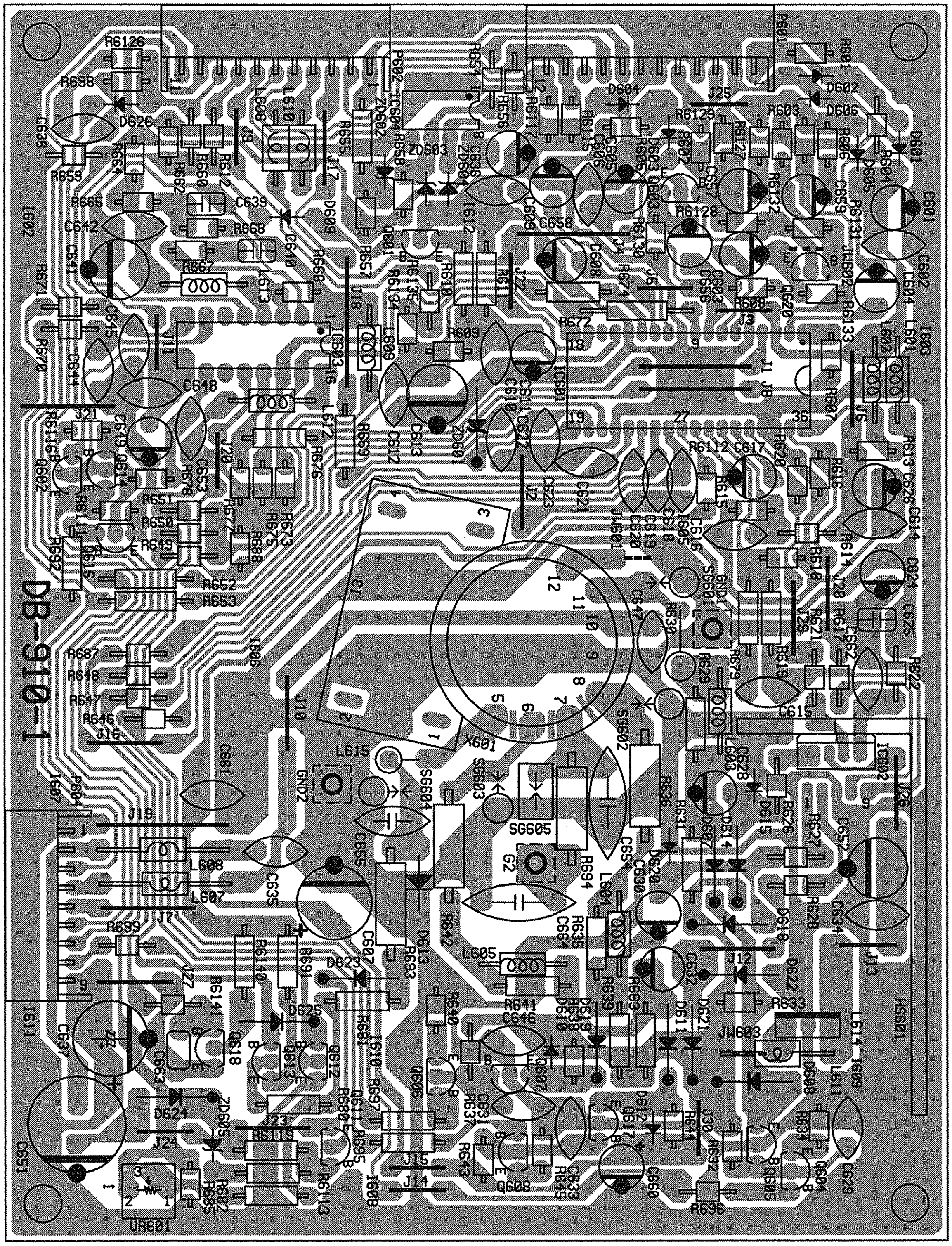
1. Mother board
2. Video board



DRAWING NO:	PM-1 910	REV:	2
USED ON:	DB-910	REV:	2
MADE BY:	S.J.CHEN	DATE:	10-01-1999

COMPONENT SIDE UNIT:MM

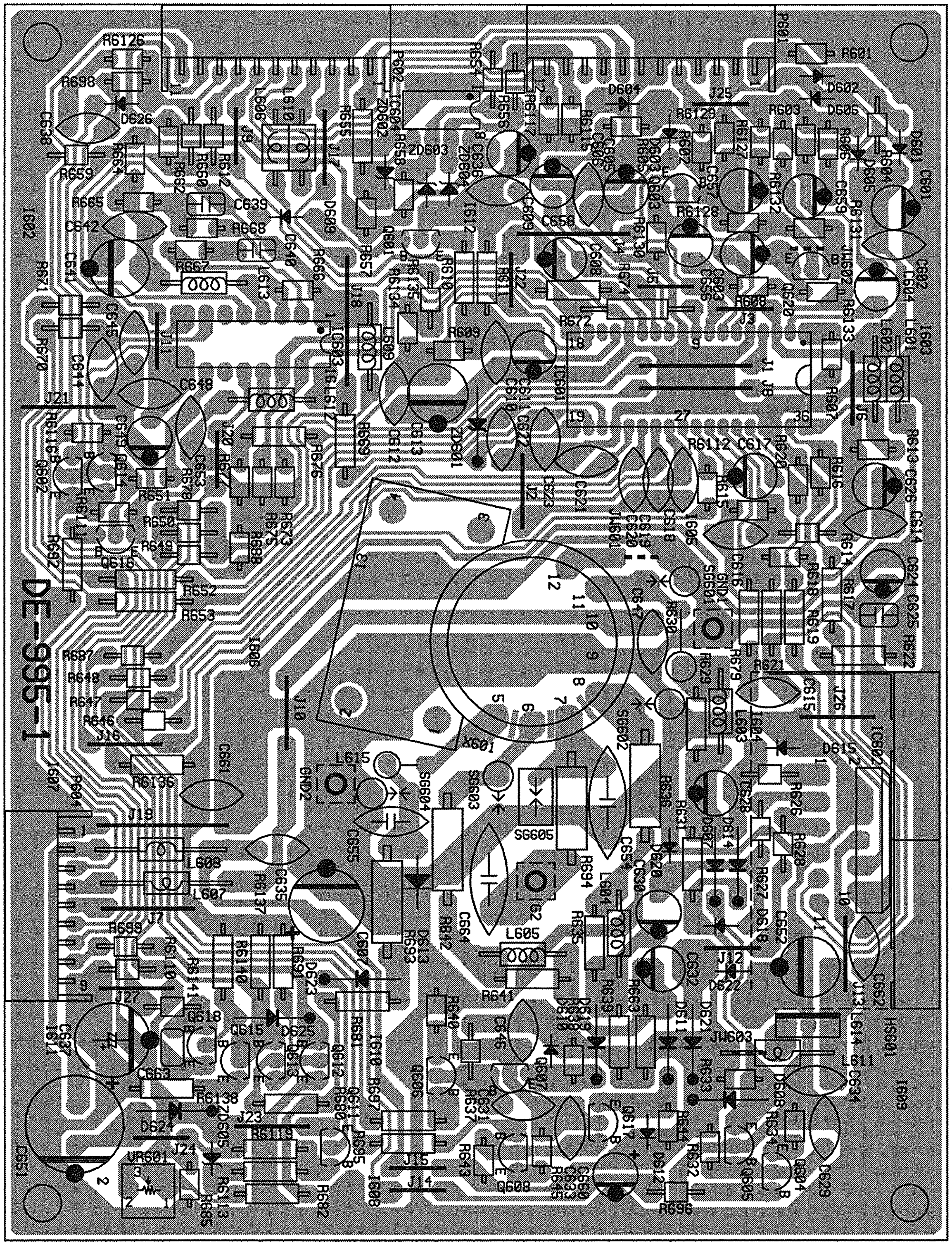
CONFIDENTIAL



CONFIDENTIAL

DRAWING NO:	PM-1-910-1	REV:	1
USED ON:	DB-910-1	REV:	1
MADE BY:	PREATY.GAN	DATE:	09/30/1999

COMPONENT SIDE



CONFIDENTIAL

DRAWING NO.: PM-1-995-1	REV: 1
USED ON: DE-995-1	REV: 1
MADE BY: PRETTY.GAN	DATE: 09/30/1999

COMPONENT SIDE UNIT: MM

9.

Recommend spare parts list

GS790 recommend spare parts list

GS790 RECOMMENDED SPARE PARTS LIST

LOCATION	PART NO.	DESCRIPTION
IC101	2510167036	KA2S1265
IC102 , IC104	2310040008	TLP721F(D4-GR)
IC203	2500004001	TL431CLP-RA
IC201	2500007001	MC7812CT
IC202	2500064036	XC62AP5002LH
IC301	2610343288	D16F78BP
IC302	2610188437	24LC16B-BLANK/MT
IC303	2610220011	MC14094BCP
IC401	2530092016	TDA4856
IC501	2530010006	TDA8172
IC404	2510005002	UC3843AN
IC901	2530054107	M52723ASP
IC601	2530063207	M52743BSP
IC602	2500113111	LM2435
IC603	2530115134	MTV021N-25
IC604	2610099042	ST24LC21BB6
R102	0190300403	RES FUSING MF 1W .22OHM J
R241	0190200403	RES FUSING MF 1/2W 0.22 J
R4122 , R4136 , R4137	0190201103	RES FUSING MF 1/2W 2.2 J
R4133	0190300503	RES FUSING MF 1W 1 J
R4141	0190302003	RES FUSING MF 1W .82 J
Q102 , Q901	2100072007	MPSA44 M
Q205	2100024001	2SC2655Y TEP2
Q201	2130007001	2SB857C
Q408	2420019015	SFS9634
Q412 , Q420 , Q421	2430044215	IRFS630A
Q422 , Q423 , Q424	2430121233	FS12KMA-5A
Q416 , Q417 , Q905	2120137009	2SD669AWC
Q418 , Q904	2130022009	2SB649AC
Q415	2120150006	2SC5411(HFE)
Q437	2430078115	SSS10N60A
Q604 , Q606 , Q608 , Q611 , Q903	2100067006	BF422 (TE2.T)
Q440 , Q605 , Q607 , Q613 , Q617	2110037006	BF423(TE2.T)
D201 , D203	2050252044	RG4C LFL1
D204 , D423	2050361644	RG4A-LFJ6
D409	2010901414	RG2
D410	2011502109	BY459X-1500
D424	2010391601	BYM26C
D427	2010271801	UF4006
R4135 , R4169	2010271401	UF4004
D413 , D414 , D422	2010271201	UF4003 TAPING

GS790 RECOMMENDED SPARE PARTS LIST

LOCATION	PART NO.	DESCRIPTION
T101	2800111100	SMT-42V-866A
T403	2817601449	LINEAR COIL 4.5uH K 4P
T401	2802400400	DT-E22-02
T402	2806531200	19A-9007 REV.A
T404	2850005809	FBT 19" 31KHZ-106KHZ
T405	2806700200	CE-22V-02
Y301	0730240212	CRYSTAL 8MHZ 30PPM 30PF
F101	0805340601	FUSE TSC 3.15A UL SEM PIG
X601	3020007200	CRT SOCKET
	3080300200	SIGNAL CABLE L=1800 BLACK
	3072029200	POWER CORD DC-570
	3361003500	FRONT BEZEL ABS 94VO(860281)
	3360201800	REAR COVER ABS 94VO(860281)
	3360601300	POWER KNOB ABS 94VO(860281)
	3360701600	FUNCTION KEY ABS 94VO(860281)
	3368034600	SWIVEL BASE ASSY ABS 94HB
	3500031300	END BLOCK-L
	3500031400	END BLOCK-R
	0741900901	HITACHI CRT 0.26mm 95KHZ M46LQW183X